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Washing Windows to Cut Lighting Bills and Reduce Spoilage

BY JOHN R. BOOHER*

ELECTRIC current costs money, whether generated or purchased. And even 200-watt lamps in proper reflectors on 10-ft. centers give less than 1 per cent of daylight. One writer has made the statement that daylight costs nothing. This is not correct, for it costs the price of cleaning windows. Therefore, the lower the window cleaning costs, the lower the daylight costs.

That dirt shuts out daylight is obvious. One research engineer has figured that the average accumulation of dirt in an ordinary industrial center, on vertical window panes, cuts down the window's lighting efficiency approximately one-sixth in three months. If the dirt is allowed to accumulate, it will eventually cut down approximately one-half of the lighting efficiency.

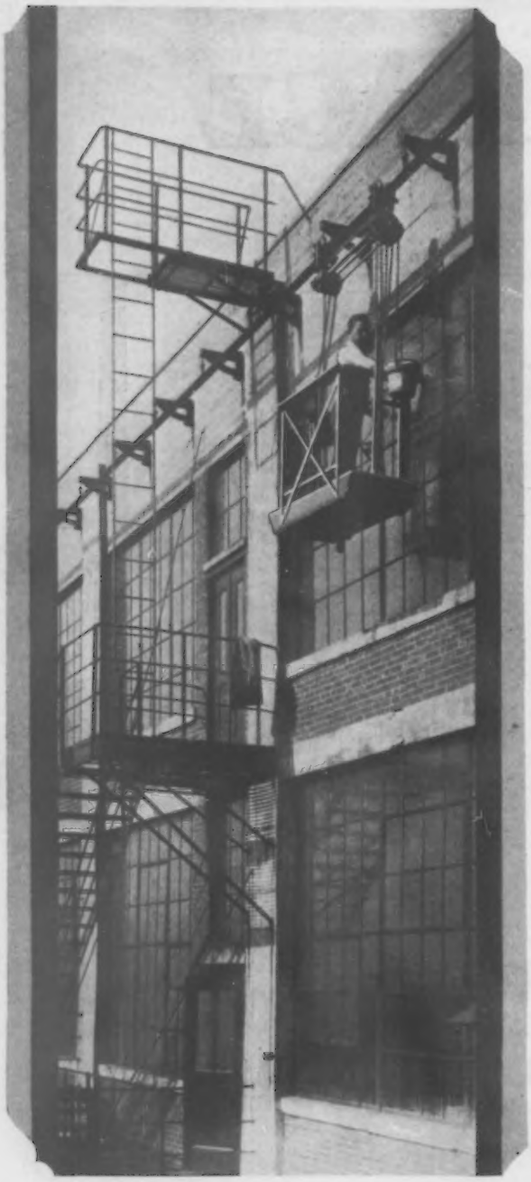
One modern tendency in factory buildings, and office buildings as well, is more glass. This is accomplished in part by putting in steel sash. But, regardless of the various methods devised for this purpose, if the windows are not kept clean, it is useless. The problem still is to get daylight and plenty of it, and this can be accomplished only by clean windows.

*Cleveland Electric Tramrail, Wickliffe, Ohio.

Higher Production When Windows Are Clean

What good is a dirty window, anyway? It is a well-known fact that greater efficiency is obtained by proper and efficient illumination. One of the most economical ways of securing proper illumination is by the proper amount of daylight. Some of the results of increased profit from correct illumination have run as high as 15 to 25 per cent more production, 25 per cent less spoilage and 25 per cent fewer accidents. The first two figures are direct savings; the last is an indirect saving, due to the fact that the cost of accidents cannot be figured definitely or accurately.

But one fact is known—that, the greater the accident ratio in a plant, the higher the compensation figures will be for that particular plant. This does not apply to a particular industry or a group of industries, but to each individual plant. Therefore each



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ABOVE Is a Window-Washing Installation at Miehle Printing Press & Mfg. Co., Chicago. The plant at right is the Western Clock Co., LaSalle, Ill. At right of next page, and at head of article, are views at the plant of De Erven van de Nelle, Rotterdam, Netherlands. Attention is directed particularly to the runways from which the washing cage hangs, and to the way corners may be negotiated

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individual plant has to pay for its own neglect in furnishing the proper amount of daylight. In addition to this, every foreman knows the great value of good daylight. Workmen are more careful, are happier, and turn out more work with less spoilage, when they can see their work with ease.

Why, then, do so many factories permit layer upon layer of soot and dirt to destroy the transparency of the glass? The cost of full light through clear glass is great enough, and the cost of half-light through dirty windows is exorbitant. When we consider the tremendous strides which have been made in industrial efficiency in other respects, it seems that clean windows constitute an item too long neglected. Washing windows from scaffold and rigging is a slow and expensive task. The cost, danger and difficulty involved have been real reasons for all the half-light or no light that so many factories supply their workmen.

Overhead Tramrail Carries Washer

In designing and developing machinery, equipment and devices for performing certain tasks, oftentimes other uses for this particular equipment are developed unexpectedly. This is just what has happened during the development of the Cleveland Tramrail method of overhead material-handling equipment. That is, the possibilities of using this same equipment for washing windows, cleaning and painting building fronts and especially in cleaning and painting window sash.

It is true that, with the ordinary office window, having a ledge on the outside, we have a method of washing windows which is considered by some to be efficient. But the safety hazard here lies in the breaking of a safety strap, or the neglect of workmen properly to adjust a strap either to himself or to the ring in the window frame.

In the Tramrail method a man is suspended in a cage adequately supported from either the eaves of the building or brackets securely bolted to the side of the build-

ing near the top. This cage is supported on easy-rolling ball-bearing carriers and is raised and lowered by use of a standard chain hoist. The workmen can easily raise the cage to the proper elevation, work around the entire building at this point, and then lower to the next row of windows, and so on down until the job is completed.

Some Examples of How It Is Done

One of the country's largest industrial plants employs 25 men continually washing windows. Even with this force they are able to wash the windows only once a year. Of the time consumed, one-third is spent in rigging scaffolds, swings, etc.

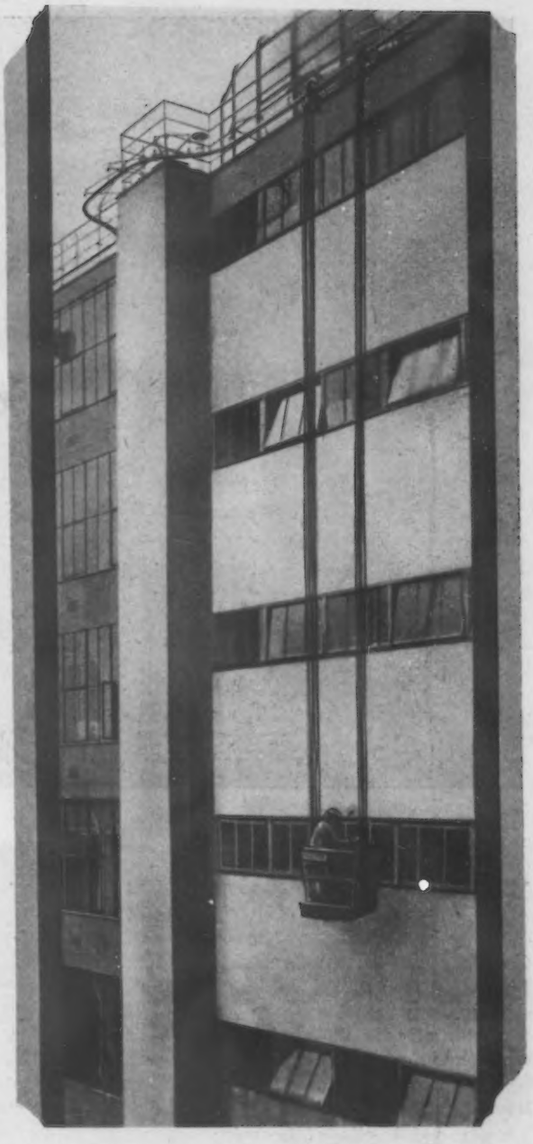
Another large industrial plant is spending 3¼c. to the pane for outside washing of windows, as against the cost of 100 sq. ft. of window washing at approximately 75c. which is being accomplished in another large plant where the tramrail window-washing system is installed. This figure includes material, labor and overhead. Overhead consists mainly of supervision, interest on investment and depreciation of equipment. The panes washed are 11 x 17 in.

These figures are based on only one man in the cage. While the Cleveland window washing equipment is designed for two men in a cage, it is possible for one man to operate it. The figures quoted above indicate that this company has found it more advantageous to use one man, rather than two.

Removes Most of the Cost

Another comparison is a large plant where the contract price for washing windows was $550. With the Tramrail window washing equipment the same group of windows is washed for $140, saving three-quarters of the previous expense.

Incidental to window washing, one company which has this equipment installed unexpectedly found another use for it in time of emergency. That is, in removing loosened cement from the building, before it had a chance to fall down into the street. The broken cement weighed 600 lb. and it was removed from the building in 19 hr.



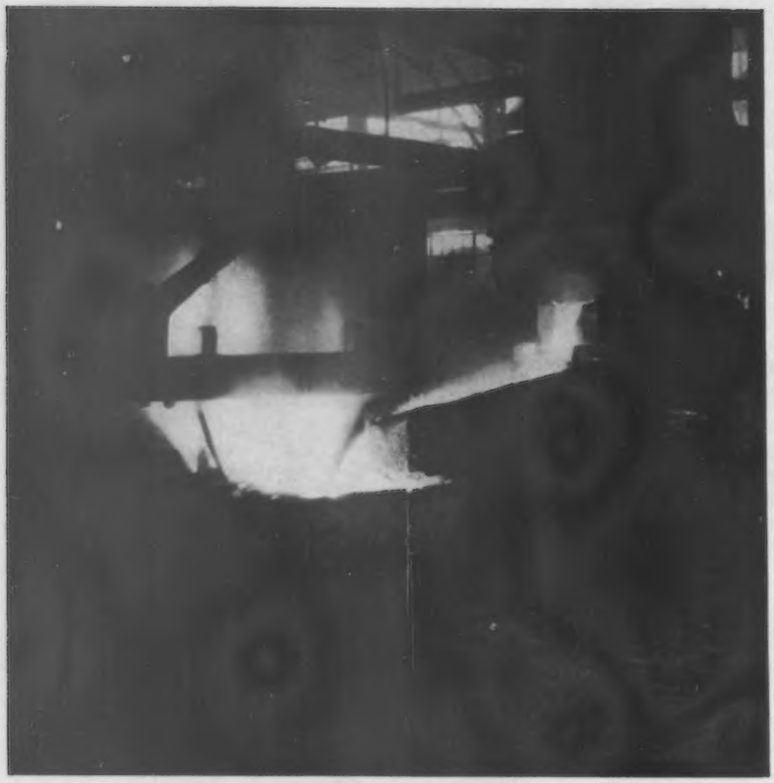
Printing Consumes Much Copper

PRINTING of newspapers in the United States and the general requirements of the various printing trades consume about 8,500,000 lb. of copper annually, according to a survey of the printing industry just completed by the Copper and Brass Research Association.

Press work, principally by newspaper presses, uses about 600,000 lb. of copper a year. Gears, bearings, cams and other incidental parts of the presses are made of copper (or its alloys), as are also the ink piping and ink pump parts. The handsome rotogravure sections of the newspapers, and other rotogravure work, consume 250,000 lb. of copper each year in printing rolls.

There are more than half a billion brass matrices in use in linotypes at the present time. Upward of 2,500,000 lb. of copper are used annually in typesetting equipment.

Electrotyping and engraving, by means of which the newspapers and other publications so swiftly visualize the day's happenings and personalities in actual pictures, are users of about 5,000,000 lb. of copper between them each year.



Duplexing with Cupola Makes High-Grade Iron Castings

BY H. E. BROMER*

WITH the express purpose of producing a much better quality of iron for cylinder and cylinder head castings at a cost which would compare favorably with cupola figures, the Standard Foundry Co., Racine, Wis., installed, in January, 1928, a 3-ton per hr. electric furnace. The high quality of electric furnace iron was already an established fact, as the findings of such prominent metallurgists as Williams and Sims of the United States Bureau of Mines; Williams and Terry of Dayton, Ohio; the late George Elliot of Cincinnati; Kerpely and Koella of Germany and many others, bear ample testimony. The Standard company, therefore, did not create anything new in the way of high-quality iron, but simply applied the electric furnace to its specialized production of cylinder and cylinder head castings on a cost basis which enables it to offer to the trade high-quality electric furnace iron on a competitive basis.

How the Best Method Was Selected

AT the time the furnace was installed the plant layout consisted of one conveyor unit, capable of handling approximately 50 tons of iron per 10-hr. day, together with the side floors which had a combined capacity of approximately 40 tons a day. It was therefore decided to utilize the electric furnace on a batch melting schedule, turning out about 30 tons per single-turn day, thus taking care of the majority of the side floor work, while the cupola continued to serve the balance of the side floors and the conveyor where it was essential to have a continuous supply of hot metal. The thought behind this procedure was that later on two more furnaces could be installed and by tapping alternate heats, a continuous supply of hot iron would be had throughout the day.

This general plan was followed for a period of a little more than a year during which much was learned as to the analysis and characteristics of electric furnace iron most suitable for cylinder and cylinder head castings. Alloy, as well as plain iron heats, were run daily, with gratifying results on both cost and quality while ample opportunity was afforded of studying both cupola and electric furnace operations as they worked side by side on exactly the same class of castings.

An interesting comparison was possible at this time as all of one company's work was made of electric furnace iron, while all of another company's was made of cupola iron. At the end of March, 1929, the first company reported that the high and the low Brinell on the bore of the cylinders received by them during the month of March was 217 and 202, a total variation for all cylinders received of only 15 points, while the other company showed a variation from 156 to 207, or 51 points.

Continuous Cold Melting Tried

The advantages of conveyor units for production work were so apparent that about this time it was decided to install a second unit of approximately 50 tons a day capacity. This made the need for a continuous supply of hot metal more imperative and it was decided to try continuous cold melting. Very good results were had with this process, but it was found that in attempting to run both the cupola and the electric furnace on a continuous basis, one interfered with the other to such an extent, that unless the plant layout was changed or more furnaces installed so that the cupola could be shut down entirely, the process would have to be abandoned. Both the batch melting and continuous cold melting schemes showed many advantages over cupola operation, but both involved additional investment in furnaces in order to take care of the maximum plant capacity of from 100 to 120 tons per single-turn day.

Futhermore, sufficient data had been gathered by this time to show conclusively that it was highly desirable to place the entire output of the plant on electric furnace

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iron. It was therefore decided to try duplexing on a continuous basis, something which had heretofore not been tried on gray iron, although both Kerpely and the late George Elliot had done much valuable work on duplexing on a batch basis, filling the furnace with molten iron and then proceeding to run the heat the same as would be done after meltdown on a cold melting batch operation.

The electric furnace and the cupola were already installed side by side, so that all that was necessary was to extend a refractory lined spout from the side of the cupola connecting with a second movable refractory lined spout which in turn emptied into the electric furnace at the rear door. With these preparations completed, duplexing operations were started without at first making any change in the cupola charge or the amount of coke used per ton. This method proved to be flexible as iron could be supplied to the conveyor lines and the side floors in whatever quantities and at whatever intervals it was needed. Daily tonnages, without any further investment in equipment, of from 50 to 150 tons a day could be turned out, and it proved to be a practical method of turning out high-quality gray iron on a competitive basis.

Process Described

THE cupola, which is a standard No. 7 Whiting, is charged in the same manner and with the same materials as formerly, with the exception that the amount of coke was cut to 135 lb. to the ton, or approximately a 14 to 1 ratio and an expensive alloy pig iron was eliminated. After the charged cupola stands for a period of from ½ hr. to 1 hr., the blast is put on and in from 8 to 10 min. the first iron starts coming over the spout. This runs directly into the electric furnace, and remains there without power on until two taps have been run in. Then power is turned on and the superheating and adjusting of analysis is started.

A total charge of approximately 16,000 lb. of hot metal is received from the cupola at intervals, after which the cupola is shut down, the necessary amount of steel, ferrosilicon and ferromanganese is added and the bath brought up to the proper tapping temperatures of approximately 3000 deg. Fahr. The amount of steel and alloys added to the bath at this time is controlled by tests taken from each cupola tap and by tests taken from the bath itself. The cupola is run so that the iron received by the electric furnace is higher in carbon and lower in silicon and manganese than desired in the finished product. This allows easy adjustment of analysis by varying the amount of steel and alloys added.

Approximately 1½ hr. after blast is put on the cupola, pouring operations are started. Just previous to this, the ladles are heated up by taking a tap from the furnace, allowing the metal to stay in the various ladles for about 5 min. and then returning all of it to the furnace. The iron is tapped from the furnace into a 2-ton ladle, handled by a floor-operated electric crane, which locates the ladle so that it can be poured directly in the monorail ladles of 600 to 800 lb. capacity each. The controls of the electric crane are located adjacent to the tilting control for the furnace so that the same man tilts the furnace and operates the electric crane.

Taps can be made of whatever size needed and, at the present time, 1200 lb. is taken out on an average of every 6 min., throughout the day's run. After every second tap, the bath is again built up by running in another charge of molten cupola iron together with the necessary amounts of steel and ferroalloys. Power is kept on the furnace for both the tapping and charging operations, except while the steel is being added, although, if necessary, power could also be kept on during this interval.

Tapping and charging operations are continued throughout the day until the cupola is emptied and the bottom dropped. From this point on, the furnace is emptied and, after it has been fully drained, the bottom is patched wherever necessary by using a few shovels of sand because an acid bottom is used. Power consumption will vary with the tonnage output but, when running 6 tons an hour or better, it is averaging between 90 and 100 kw.hr. per ton.

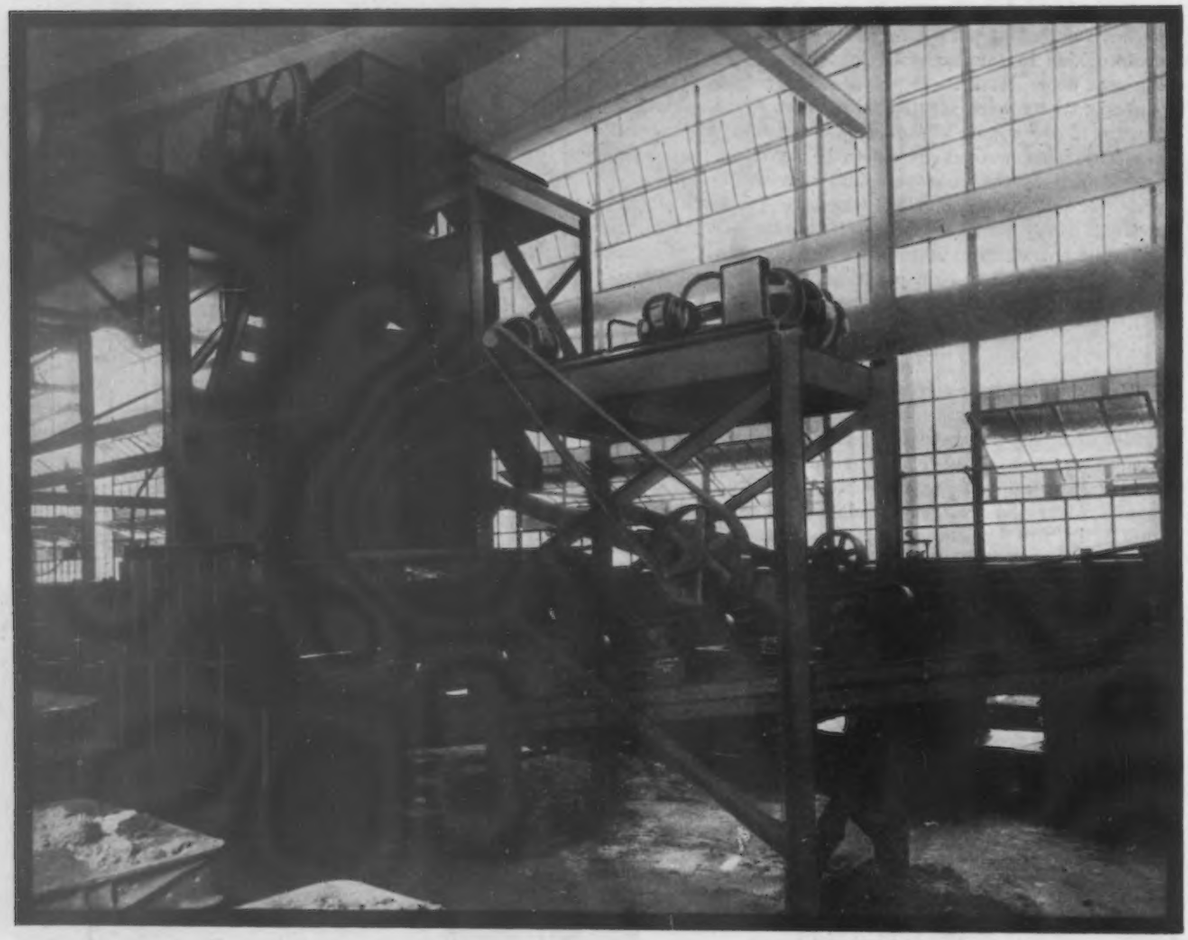
Electrode consumption over a 6-month period of rather low tonnage output showed an average of 3.9 lb. of graphite electrodes per ton. A roof runs from 6 to 8

ELECTRIC Furnace Is Charged with Molten Cupola Iron Directly Into Rear of the Furnace. (Opposite page). Gray Iron as It Flows from the Electric Furnace After Refining. Note controls for the electric overhead crane at the elbow of the operator

weeks and lasts for from 1500 to 3000 tons, while side wall life is better, running from 2500 to 5000 tons or more, depending of course on tonnage produced.

Advantages of Electric Process Are Many

MANY advantages of the electric process, as developed at the Standard Foundry Co., can be listed. Foremost among these is the quality and unformity of the iron produced. At least six standard arbitration bars are broken daily and an average of these over the past eight months shows over 4800 lb. transverse strength with a deflection of 0.13 in. This average is on the plain iron without any alloys and is all the more remarkable when it is considered that, of the large number of bars broken (more than 1000), the lowest breaking load was 4200 lb. (except on bars actually defective) while the highest was 5400 lb. More than 90 per cent of all the bars lay within the narrow limits of 4600 and 5000 lb., which illustrates vividly the uniformity of the product. Tensile tests made on a number of bars cut from the transverse bars show an average strength of 40,000 lb. per sq. in.



THIS Molding Sand Preparation Equipment Has a Capacity of 40 Tons an Hour

Alloy Irons Also Produced

Alloy irons are also produced daily and, depending on the alloy content and the purpose for which it is to be used, the strengths range from 5500 to 7000 lb. transverse with deflections from 0.14 to 0.18 in. Tensile strengths run from 45,000 to as high as 60,000 lb. per sq. in., all with excellent machinability, as has been proved in various machine shops.

Impact Values Are Higher

Another interesting feature of electric process iron is that the impact values obtained so far show, for plain iron, approximately twice as high as for the cupola product, while the plain iron figure has been doubled by the proper use of alloys. Impact values are, however, of very little value for comparative purposes except when made by the same laboratory for comparisons within one's own shop. This is a field apparently filled with considerable possibilities and it is believed that tests, properly standardized and carried out, would give much valuable information to the purchasers of gray iron castings.

Electric Furnace Cuts Down Need for Alloys

It should be remembered here that the Standard company specializes in nothing but cylinder and cylinder head castings, so that the electric process iron had to be developed not only with high strength and a high Brinell hardness but also for ready machinability. The uniformity of carbon and silicon analysis is therefore doubly important in this class of work as high strength, high Brinell plain irons are quite prone to have hard edges and an excessive amount of iron carbide in the matrix.

This difficulty has been overcome to some extent in cupola iron by the use of expensive alloys, but with the

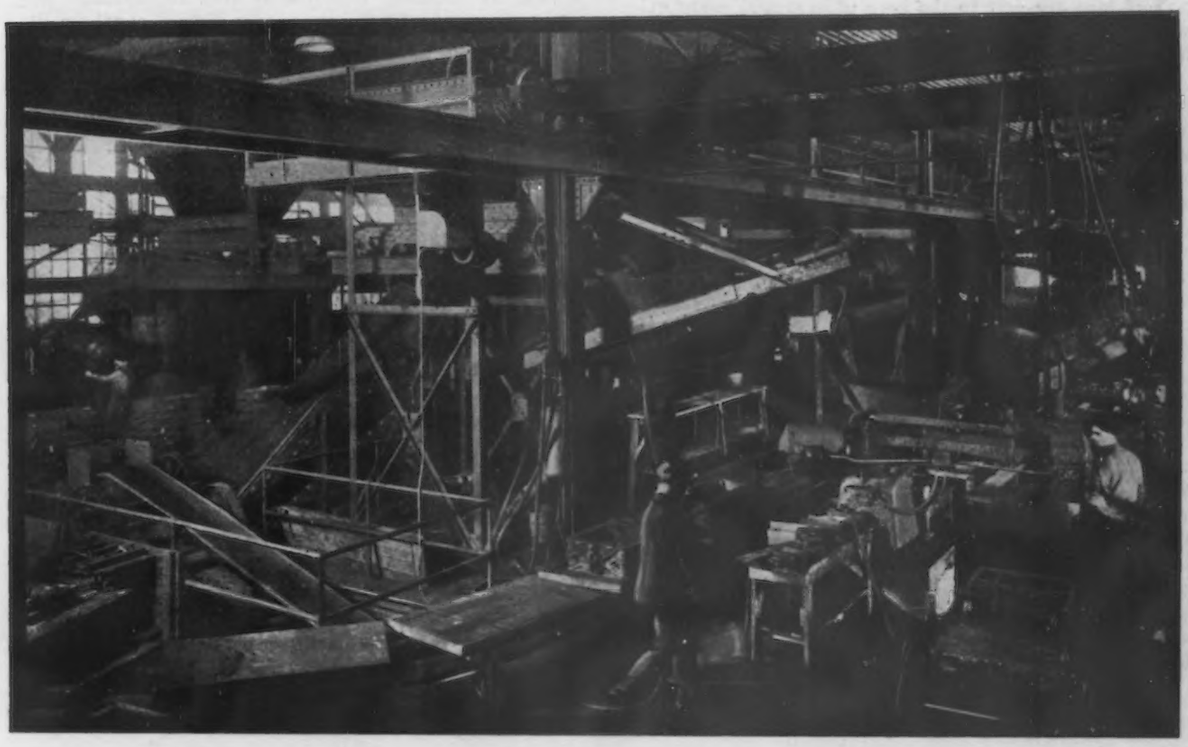
electric process iron this is not necessary as the very narrow limits within which the carbon and silicon are controlled insure a uniform product. This does not mean that alloys are not being used with the electric process iron but simply that their use has been confined to heavy duty work where still higher strength and Brinell hardness is required.

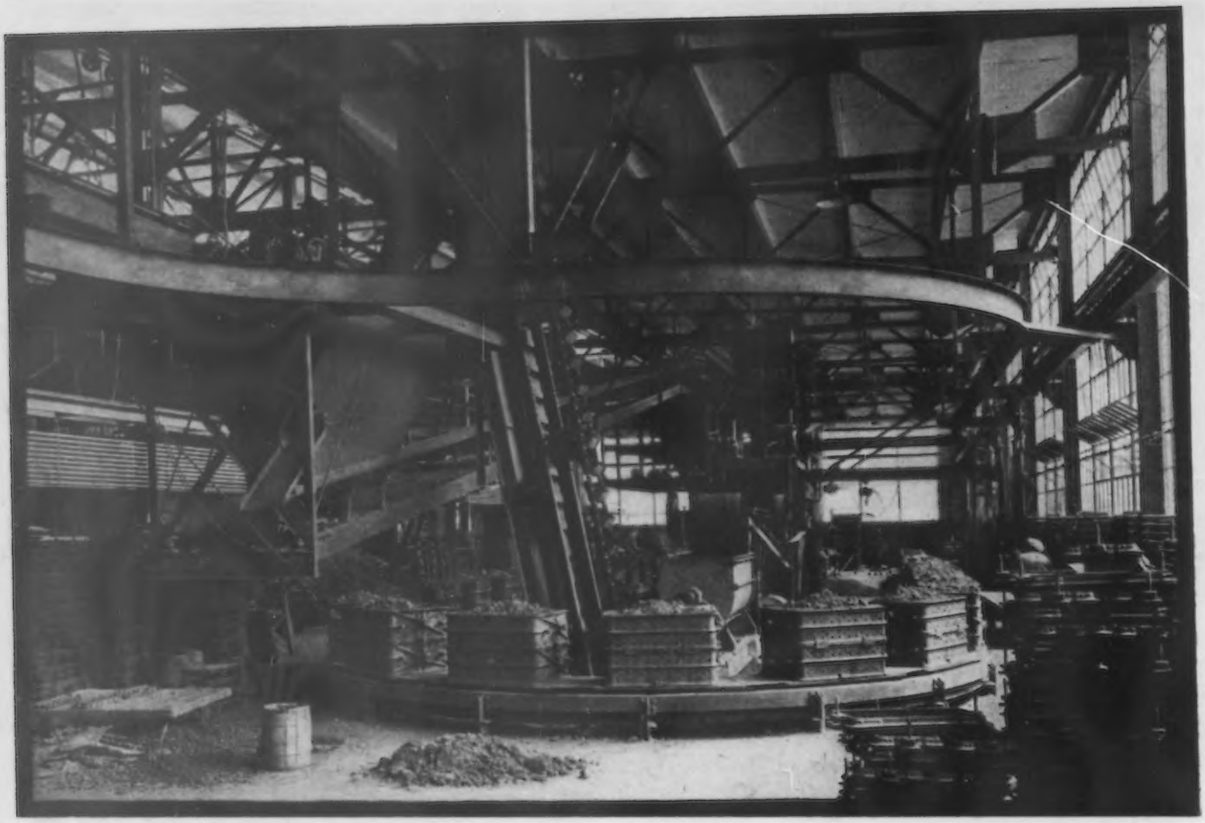
Aside from the benefits derived from very close control of analysis and melting conditions (such as oxidation, etc.) the electric furnace has proved to be of great benefit, due to its ability to superheat the iron. The high temperatures involved throw all the carbon into solution so that the resulting graphite precipitated in the casting is very finely divided and evenly distributed. The high temperature also produces a uniform structure in the iron itself which, coupled with the uniformly distributed graphite, promotes easy machinability as well as better wearing qualities and longer life.

Uniform Brinell Hardness

Uniform analysis and structure resulting from the electric process insures practically the same Brinell hardness throughout the casting as well as that each and every casting is held to a certain Brinell on the bore within very narrow limits. Motor builders, and rightfully so, are daily increasing the severity

SMALL Cores Are Made on Vibrating Machines (Above). Core ovens are oil-fired. Molding and Core Setting Ends of the Two Conveyor Units





APPARATUS for Conditioning the Sand Stands Inside of the Conveyor Which Handles the Molds

of their Brinell specifications both as to demanding a high Brinell iron as well as to holding it within a narrow range. No difficulty whatsoever has been had in holding within these limits even though some purchasers demand a 170 and others a 217 or a 235 Brinell.

Test lugs are cast in the bore of each and every cylinder made, two to a casting, the one being retained by the company for its records, the other remaining in the cylinder block to be knocked out and tested by the purchaser. At first thought it would seem that these test lugs, which are approximately 2 in. long, ⅝ in. wide and ⅜ in. thick would not give a true reading of the Brinell on the bore of the cylinder, but actual cutting up of the blocks to obtain a test on the bore and the lug at the same time has shown conclusively that the two are the same within very few points. The annealing action of the body cores, especially in the water jacket section where the lugs are placed, accounts for the fact that the lug and the bore itself are so similar.

Costs Are Materially Lowered

LAST but not least there is a further advantage of the duplex process which has helped materially to lower the costs. It is a fact that no metal whatsoever is pigged throughout the day's run. With cupola operation this is impossible and, as a result, a large amount of iron is pigged daily, especially in plants employing continuous molding and pouring. It is often necessary to shut down the cupola due to breakdowns or because the molding cannot keep step with the cupola operation, and formerly an average of about 10 per cent of the total melt had to be pigged every day.

With the electric process, however, all drops and all iron which has fallen below a certain pouring temperature are returned to the furnace, and the total melt is calculated in such a way that one or two molds are left standing over night, rather than have any iron left over at the end of the day. These various advantages plus numerous others have enabled the Standard Foundry Co. to produce a uniformly high-quality iron for cylinder and cylinder head castings at a cost figure equal to its former cost in cupola metal.

Mold Wash for Use When Die Casting Brass

AT the February meeting of the Association Technique de Fonderie (Paris) Louis Arbellot discussed the question of mold washes, particularly those used in permanent molds for brass. Notwithstanding precautions, defects frequently occur in these castings which are due directly to the molding practice.

The commonly used mixture (1 qt. of linseed oil to 1 lb. of soft soap) frequently causes skin defects on the castings, especially when the mixture is badly applied. His experiments with water and graphite on molds heated to 100 deg., showed that a satisfactory smooth surface was produced, but the graphite adhered to the casting. Unsatisfactory results were given by various mixtures of lime, molasses, linseed oil, rosin, ground nut oil, tar, beeswax and soft soap, as none of them were sufficiently refractory.

Of all the mixtures tried the best results were given by linseed oil, rosin and plumbago when mixed so that the flash point is about 275 deg. C. The investigation leads to the conclusion that success depends largely on the flash point, viscosity and refractoriness of the wash.

Screws Made in Modern Plant

Discriminating Purchasers Require Precise Wood and Machine Screws in a Variety of Surface Finishes

By C. B. PHILLIPS*

MANUFACTURE of screws and bolts is a striking example of the trend of the times in metal fabrication. Despite efforts to standardize dimensions there is a constantly growing demand for special properties and finishes. The old time maker relied entirely on steel and machines, but nowadays he must utilize the most advanced ideas of metallurgist, machinist, heat treater and metal finisher to satisfy his trade and expand his sales. Such is the situation found in the Rockford, Ill., plant of Elco Tool & Screw Corporation. Flexibility in manufacturing routine and efficient warehousing, stock keeping and shipping departments are also necessary to handle all the sizes of wood screws, machine screws, cap and lag screws, from small ones up to ½ in. diameter, and as demanded in such finishes as bare polished, plated with cadmium, copper, brass, nickel or chromium, blued, oxidized, Parkerized or raven black.

Special Trimming and Threading Machines

AUTOMATIC machinery for these operations are most interesting. Many of them have been invented and built by the Elco Corporation's own staff. As usual, the raw screw stock is wire or rod—size limits in the Rockford plant are 3/64 and ½ in. diameter. First operations are done on cold heading machines—most of them two-die machines cutting off the wire and ramming up the screw head—operating at from 40 to 250 blanks per hour, depending on the size.

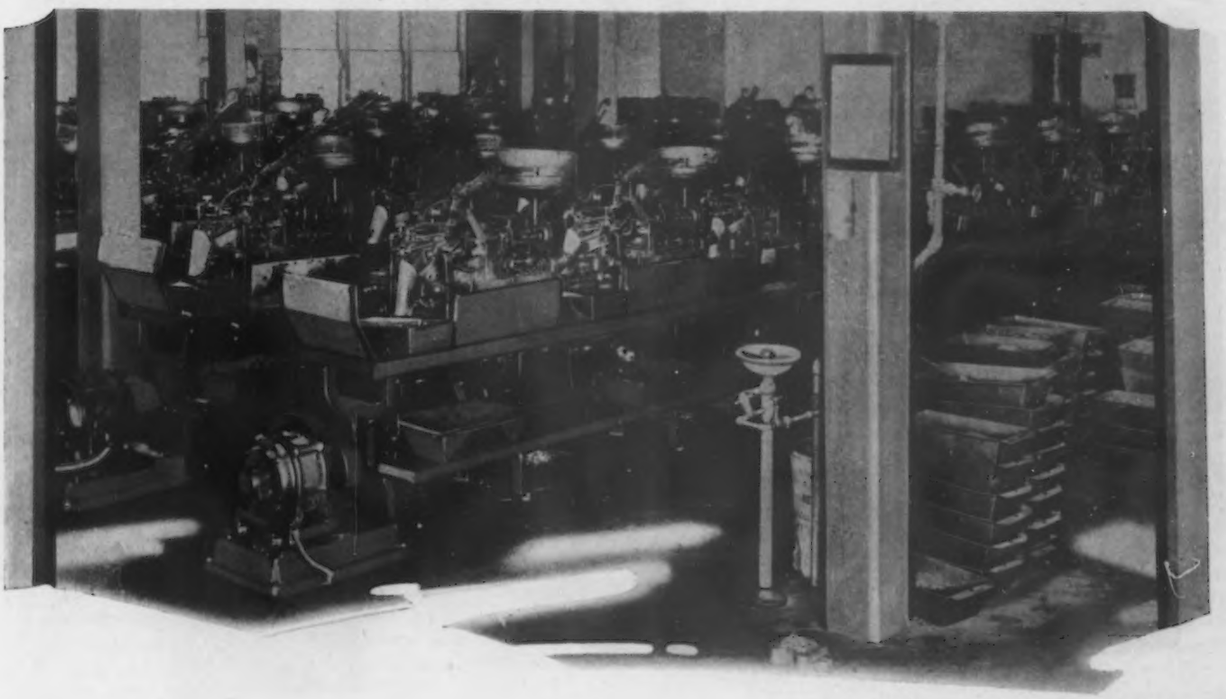
Considerable machine work must be done on these blanks to produce the required quality of product. For a major fraction of the tonnage of bolts produced in America, a head formed hot or cold in a bull dozer and a rolled thread is quite good enough. In fact, some of the machine screws made by the Elco Corporation have rolled threads. But wood screws, with a sharp thread, tapering at the end, and clean, well-shaped heads, are cut in batteries of automatic machinery, such as shown in the views.

Screw head shavers, or trimmers, have an automatic feed from a hopper. Heads are trimmed with a "three-in-one" tool, one edge cutting the conical or flat under side, one facing the flat or button-headed top and the third trimming any burr or fin at the edge where these two surfaces meet. All this is done in a single operation, and immediately the holding fixture moves the head past a circular saw which cuts the screw-driver slot.

Another view shows the threading machines for wood screws. Since they, too, are fully automatic, one man and a helper can tend at least a dozen machines. Finished screws and thread chips are both ejected into the same work pan, and later are put through a unique separator consisting of a cylindrical tube about 2 ft. in diameter and 12

*Vice-president Surface Combustion Co., Toledo, Ohio.

A Battery of Automatic Machines for Shaving Screw Heads and Slotting Screw-Driver Groove



ft. long, set at a slope of about 15 deg. The mixed screws and chips are fed into this tube, which rotates while a blast of air throws the chips out at the rear; the screws, being heavier, are carried by the rotating inclined tube to its lower end where they fall into clean pans.

Cutting Oil Removed in Perforated Cylinder

FINISHED screws are washed in an interesting special machine consisting of a perforated steel cylinder, some 2 ft. in diameter and 30 ft. long. As shown in the view, a series of tanks, combustion chambers and hoods are arranged along the length. The cylinder is rotated by a motor drive, while dippers, built into the charging end of the cylinder, scoop steam-heated solution from the tanks and dash it on the work as it passes through the cylinder. The dirty water then drains back into filtering chambers before returning to a make-up tank feeding the machine.

Three of these tanks contain different solutions; the first penetrates and loosens the oily, gummy coating on the product, the second is a strong washing solution, while the third tank contains a clear rinse water.

The last half of this washing machine unit is placed over a combustion chamber containing a series of gas burners. Heat enters the perforated cylinder and is recirculated by a motor-operated fan and a series of ducts placed along the sides of the combustion chamber. Washed and dried product rolls out at the discharge end into a chute to the inspection department on the floor below.

Hexagon headed cap screws are cold-headed from round wire of high carbon steel, the upset heads being round in shape. After a preliminary tumbling or burnishing operation, a battery of fully automatic trimming machines push the blanks through a hexagon-shaped die, the blanks emerging at the front of the machine while the scrap drops from the trimming die into a separate container. The ends of the body and the heads are then finished in special equipment similar to the shaving machines for wood screws.

The larger portion of the cap screw production is then routed over the rolled thread equipment, although certain sizes are made with cut threads, the type of thread being determined by the size involved and by the customer's requirements. All cap screws are heat treated or normalized.

Eight Heat Treatment Furnaces Utilized

IN the view taken in the heat treatment department, five of the seven furnaces are standard gas-fired units made by the Surface Combustion Co., Toledo, Ohio.

Two are cyanide pots of alloy steel, 12 in. diameter and 18 in. deep, set in round steel casings, brick lined. Tangential firing with two gas burners prolong the life of the pots and heat them by direct radiation.

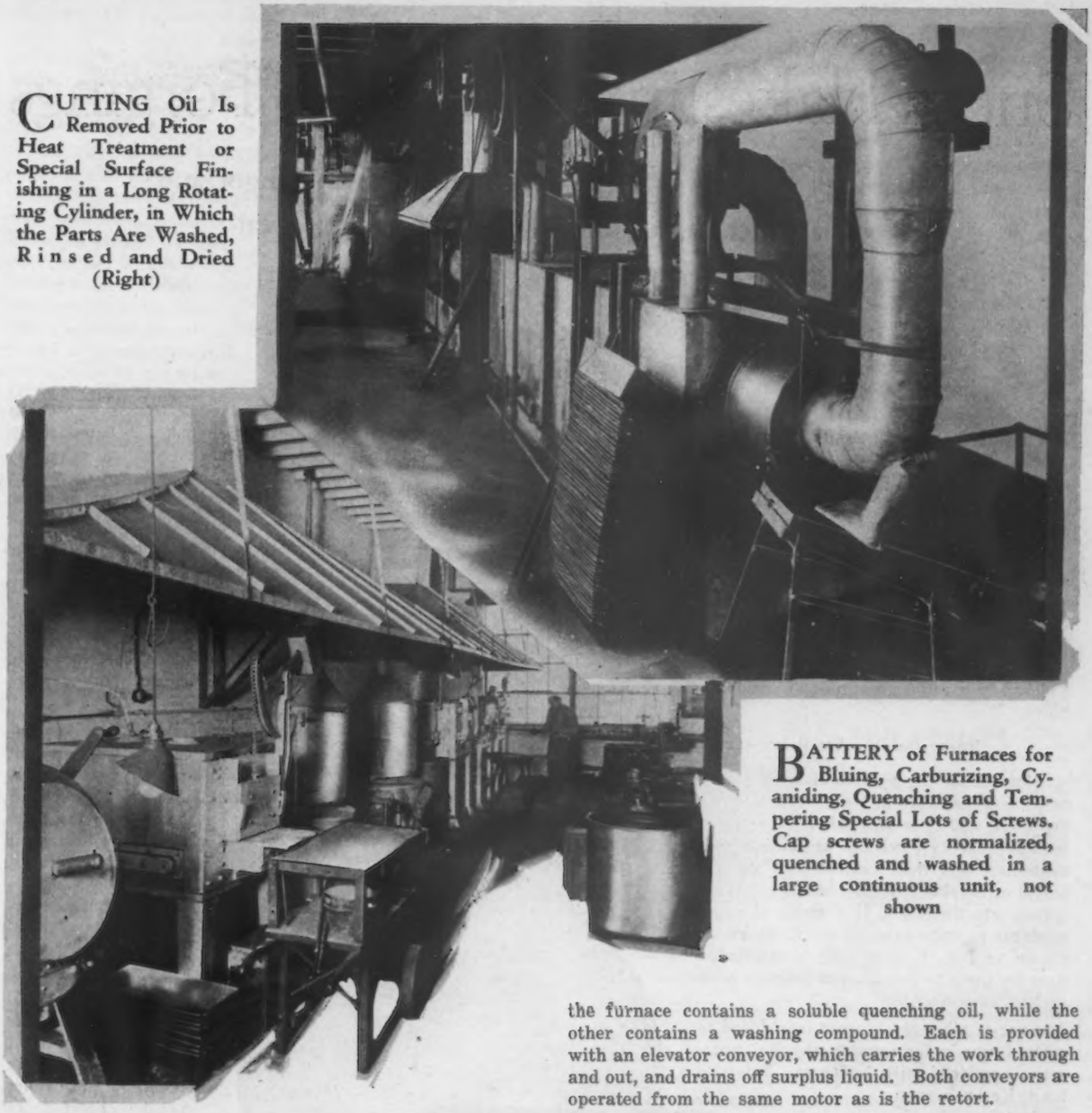
Other units are three oven furnaces, with fireclay hearths 15 by 21 in. dimension, and are used interchangeably for all kinds of heat treatment. Any gas-air ratio desired—reducing, neutral or oxidizing—can be set and automatically maintained as the nature of the work dictates. Two of them require 385 cu. ft. each of 550-B.t.u. gas to heat up to 1600 deg. Fahr. and thereafter 200 cu. ft. per hr. to maintain this heat. They can be operated within a temperature range of 1000 to 2000 deg. Fahr. The third is equipped with larger burners and is used for high-temperature work, such as for high-speed tools.

Carburizing is accomplished in a 16 x 26-in. furnace. An oil bath is used for tempering.

For bluing there is a small rotary furnace (shown in the foreground of the view of the heat treating department) consisting of a sheet steel cylindrical shell, 4 ft. long and 3 ft. in diameter, fitted with an alloy steel tub-like retort, which revolves on a short shaft attached at the rear. The shell is refractory lined and is heated with one long gas pipe burner. The whole can be tipped for discharging. No carburizing compound or quench is employed and the work remains in the retort from 15 to 20 min. at 960 deg. Fahr. Temperature control for these various units is aided by the use of a visual pyrometer and a multi-point switchboard.

Normalizing or heat treating cap screws, which is the principal duty of this depart-

LABOR for Operating These Thread-Cutting Machines Consists Largely of Keeping Feed Hoppers Filled and Removing Pans of Finished Product



CUTTING Oil Is Removed Prior to Heat Treatment or Special Surface Finishing in a Long Rotating Cylinder, in Which the Parts Are Washed, Rinsed and Dried (Right)

BATTERY of Furnaces for Bluing, Carburizing, Cyaniding, Quenching and Tempering Special Lots of Screws. Cap screws are normalized, quenched and washed in a large continuous unit, not shown

ment, is accomplished in an automatic rotary furnace, 8 ft. long and 3 ft. in diameter. It is heated with 10 gas burners on each side. It consists of a steel shell, refractory lined, in which revolves an alloy steel retort equipped inside with a worm to move the work forward. Screws and bolts are shoveled into a hopper located under the furnace. A dipper, which is part of the leading end of the retort and adjustable as to the number of screws it will hold, scoops up the work on each rotation. The motor-driven retort is operated through a chain drive and speed-reduction gear train, the normalizing period (4 to 20 min.) being regulated through the speed of rotation of the retort. Temperature is automatically maintained at 1150 deg. Fahr. by a control system connected with a visual pyrometer and solenoid valves on the gas supply lines. The discharge end of the retort is closed and the heated screws drop out through a small hole in the wall, passing through an inclosed chute directly into the quench, so that no air comes in contact with them.

Directly in front of the furnace are two steel tanks, each 14 ft. long, 4 ft. high and 3 ft. wide. The one nearest the furnace contains a soluble quenching oil, while the other contains a washing compound. Each is provided with an elevator conveyor, which carries the work through and out, and drains off surplus liquid. Both conveyors are operated from the same motor as is the retort.

What the Engineer Has Yet to Do

THE duty of the engineer in the immediate future is the removal of all the objectionable features which accompany his works. Such was the statement of Loughnan St. L. Pendred, editor of *Engineer*, London, who, as president of the Institution of Mechanical Engineers, represented Great Britain at the fiftieth anniversary celebration early in April of the American Society of Mechanical Engineers.

"Since it is the duty and function of the engineer to increase man's comfort and well-being," said he, "every collateral defect which may accompany the improvements which he effects by his skill and knowledge must be regarded as a diminution of the total benefit which could be secured. Thus, while the factory and the power-house may increase comfort and add to the amenities, they do not reach their full sociological efficiency as long as they poison the atmopshere or load it with dust. Or, again, the thousand mechanisms which are employed for transportation and other useful purposes are wanting in perfection as long as they produce excessive and injurious noises."

Snow Flakes in Alloy Steel Forgings

Lie Well Below the Surface—Origin Is in the Ingot and Mass Action the Ultimate Cause—Heat Treatment Will Not Cure

BY H. H. ASHDOWN*

MANY manufacturers of alloy steel forgings today are confronted with the problem of "snow flakes" and are still unable to prevent it. It is a matter of vital importance and, by simple precautionary measures, can be prevented absolutely without restricting production and at very small additional operating cost.

These defects, being concealed, are more general than supposed, and occur more frequently in forgings of larger section or at marked changes in sectional areas. It is at these junctures where stresses are localized in service, and fracture takes place. Alloy steels have an enormous future, but for their further development the engineer must and can be given a guarantee of consistency and dependability.

These Defects Are Below the Surface

Not unlike ingot pipe, these defects usually lie well beneath the surface of the forging and well removed from the ends, and it is only when these forgings are deeply machined or transversely examined, and then subjected to the removal of surplus from the ends, that these defects are disclosed. If a series of small ruptures already exist in the forgings, as shown in Fig. 1, it is only a matter of time for them to link up, and fracture with serious consequences.

Special alloy steels were introduced to meet demands for greater physical properties combined with lightness. This end has been accomplished but the demand still is for greater developments along those lines. This material is extensively used in the most important details of automobiles, airplanes, railroads, light sea craft, electrical generating equipment, etc., and failures have occurred from this cause.

These defects gain greater prominence where engineers enforce a more rigid specification, including transverse testing or etching examination. The presence of snow flakes is indicated by a type of hair line, observed on the longitudinal examination of finished machined forgings, but it is not correct to assume that all hair lines suggest the presence of snow flakes.

The writer's first introduction to the snow flake problem was in 1913 during the manufacture of large nickel steel forgings, but from careful observation made since over a long period, it would appear in this material to be of unusual occurrence. It has, however, been, and still is, more freely seen in the nickel-chrome alloys, including those containing molybdenum and occasionally in tool steel forgings in large section.

Suggestions have been advanced from time to time as to the cause of this phenomenon. Crouse in 1920, in a contribution to *Chemical and Metallurgical Engineering*, stated that he had observed snow flakes in ingots which had been split for examination down their longitudinal center. That type of fracture would, however, be very different from that observed in a forging.

Although there is little question but that the origin is in the ingot, it cannot yet be accepted, as stated by some, that any particular casts of steel will be immune, that is, if the forgings receive only normal treatment. Fig. 1 is an example of a forging selected at random, made from a cast which, it was assured, would be free from this defect.

Infinite care at every stage of manufacture has been exercised by the most experienced alloy steel makers in steelmaking, both open-hearth and electric, with the great-

FIG. 1.—Series of Small Ruptures in a Forging, Selected at Random. The heat was assured to be free from such defects. Fig. 2.—(Above) Ingot Supposed to Have Been Made to Be Free of Defects

*Formerly metallurgist and engineer for several large British steel companies. Now located in New York.

est attention to the preparation of ladles, molds, casting conditions and subsequent care of ingots, and yet on examination of the forgings made from them they were found to contain the widespread defects shown in Fig. 2. These defects occur equally pronounced in forgings made from ingots of 10 cwt. up to 120 tons, both in solid and hollow forgings.

Although it may be admitted that non-metallic inclusions in the ingot are a possible cause, an experiment made some years ago may be of interest. A 3-ton ingot was split longitudinally down its center and one half forged into a 6-in. diameter bar. It will be appreciated, in this manner, that the segregation would be greater toward the outside of a portion of this forging, and yet when the bar was cut in half, snow flakes were localized around its central axis.

Snow Flakes Do Occur in Hollow Forgings

Again it has been stated that snow flakes do not occur in hollow forgings. That statement is incorrect. Some years ago I had, under examination, very costly hollow forgings of large dimensions where snow flakes were well developed, and this in a smaller type of forging has been proved by Greaves. The effect of mass action is sometimes lost sight of and, although using the word mass may be only comparative, as the volume need not necessarily be great, this may account for the diversity of results by different observers.

Having established the presence of these defects in the forgings it remained to be proved at what stage of manufacture they occurred. In 1918 in a paper presented in Sheffield, England, this subject of snow flakes was introduced and in that paper attention was called particularly to the transverse shape of these defects which in almost every instance was truly circular, and it was stated that this in itself was sufficient evidence that the defects as such were not from the ingot but had developed after the completion of the forging. Were this not the case, the defects must have been anything but circular, due to distortion during forging operations. It has already been stated that defects were readily detected on testing or fracturing transversely (Fig. 3), which implies that this would be subject to the prescribed oil treatment of such forgings.

It therefore remained to be proved whether these defects developed immediately after forging or in the early stages of heat treatment. It is self-evident the trouble does not occur after the forging has been heat treated above the upper transformation point of the steel, as these silvery spots are of a coarse and unrefined structure, and it is for this reason they appear to be more silvery, as the larger crystalline faces gives a greater reflection of light.

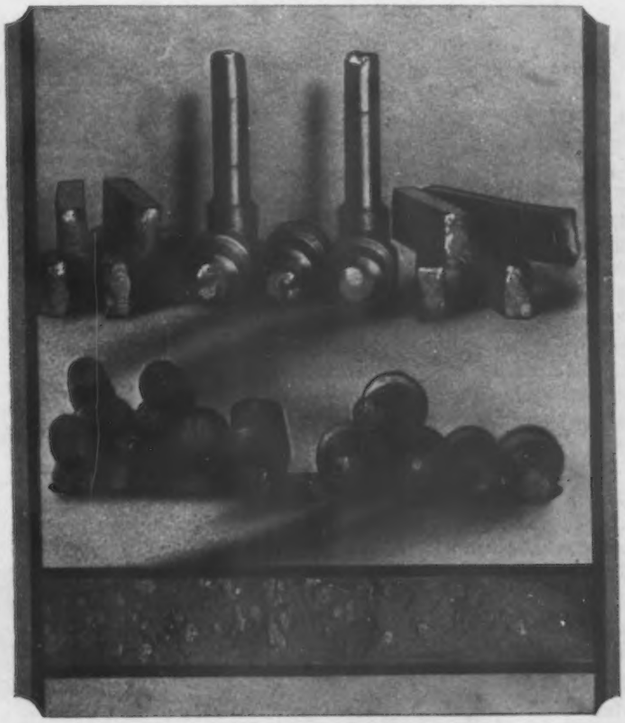


FIG. 3.—Defects, or Snow Flakes, Detected in Test Pieces, Longitudinal and Transverse, of Open-Hearth and Electric Furnace Steel. Reproduction in the band at bottom is of electric steel

On examination of the transverse fractures of the untreated forgings, there is no apparent difference in the general structure, and little indication of any defects, the reason being that the structural condition of both the small clinks and the general structure of the forging is the same.

The next step was to cut disks from the forgings, then polish and etch. The defects were at once revealed by numerous dark lines due to acid attack, which were actually sections through the snow flakes ruptures. This was sure evidence of the stage at which these internal ruptures took place.

There was yet illusiveness as to these defects relative to the ends of the forgings, as a disk cut from the extreme ends, polished and etched, disclosed none of these defects, but in each case, after the removal of 6 in. of material and further examination, the defects were at once apparent. From general examination it is evident that segregation is a basis of weakness, and from whatever cause, it lends itself freely to the development of these defects.

Mass Action the Ultimate Cause

No sharp conclusion must be drawn here that badly segregated steels will develop any, or a great amount of, snow flakes as it will be noted later, mass action is the ultimate cause in forgings normally handled.

Smaller forgings, up to 3 in. cross section, made from the same casts and under identical conditions as the larger forgings, seldom contain any of these defects, the assumption being that these defects are largely the result of internal cooling stresses during the passage of, or after passing through, the lower transformation range, and in these smaller sections the tension is more freely relieved.

This assumption also lends support to the cause of localized defects at abrupt changes of section and their absence in the ends of forgings. A. Holtgren, in a paper on "Defects in Chrome Steels" before the British Iron and Steel Institute in 1925, stated that these defects may be prevented by slowly cooling the finished forgings, and in the discussion on that paper the writer fully concurred, as it supported much of his own experience.

For forgings of large sectional area, or of quick set-downs, the best practice is to take them from the forge while hot and complete the refining or normalizing treatment. This removes all possible risk of snow flakes forming.

Not Corrected by Heat Treatment

Once this disease has developed, no form of heat treatment will correct it, and the forgings as such are in a dangerous condition and useless for the purpose intended.

(*Concluded on page* 1429)

Welded Girders Fabricated by Machine

Bridge Carrying Welding Equipment Travels Down Bay Within Which Units Are Assembled

BY A. D. BENSON*

THE Cleveland Crane & Engineering Co., Wickliffe, Ohio, built its first crane by hand welding in 1927. This was followed by nine all-welded cranes in 1928. Arc welding presented such good possibilities that it was then adopted as standard for end trucks and trolleys, and owing to the increased demand for welding the automatic machine shown in the figure was constructed.

It contains two automatic arc welding equipments, each consisting of a 400-amp. single operator welding generator set, an automatic welding head, a control panel, a meter panel and a small motor-generator set to supply current to the wire feed and control motors. Power at 440 volts, 3 phase, 60 cycles, is supplied to the machine through a trolley and collector system along the wall of the building.

The machine is really a traveling bridge with one end supported by a tram rail along the side of the building while the other runs on a rail embedded in the floor. Approximately 85 per cent of the weight of the machine is carried on the rail in the floor, which serves a twofold purpose of reducing vibration and giving a good support for the entire electric equipment. As shown, the welding generator sets are mounted in the A-frame one above the other, together with the control panels and small motor-generator set. Hand chains are provided to raise or lower the vertical masts carrying the welding heads and another chain moves trolleys carrying these heads at right angles to the direction of travel of the machine. Worm screw drive gives each operator the flexible and precise control of each head and arc within his reach while welding.

The entire machine is traversed by means of a 5-hp., 1800-r.p.m., constant-speed induction motor. The speed of traversing is changed at the will of the operator by changing the ratio of a train of gears between the driving motor and the driving wheels.

An end truck of a bridge crane is shown assembled ready for welding. Another view shows the machine welding an 86-ft. girder for a 10-ton crane to be used in a steel

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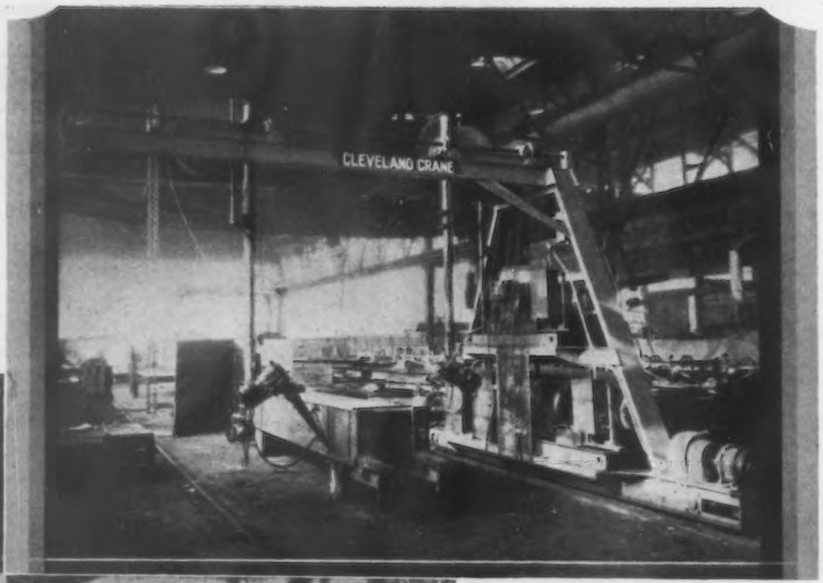
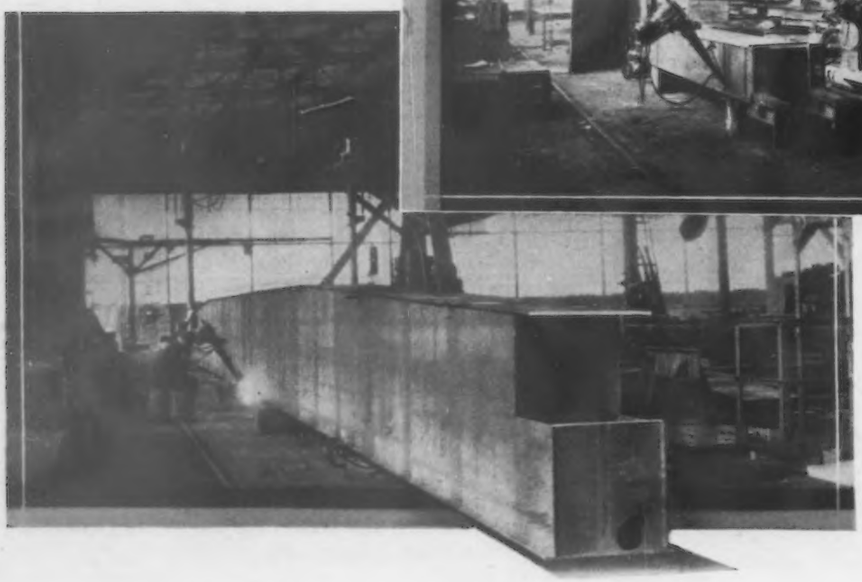
*General Electric Co., Cleveland, Ohio.



TRAVELLING Bridge Carries Welding Equipment Necessary for Making Long Straight Seams On Girders and Similar Structural Shapes (At Right)



TRACKAGE and Floor Space Is Provided for the Manufacture of Girders Up to 125 Ft. Long (At Left)

BOOK REVIEWS

A Permanent Change in the Order Basis

Hand-to-Mouth Buying. By Leverett S. Lyon. 471 pages, 5 x 7½ in., illustrated. Published by the Brookings Institution, Washington. Price $4.

If one of an author's jobs is to get his book read, the use of the title as a bait to attract readers is legitimate. Mr. Lyon's use of that catch-phrase "hand-to-mouth buying" as his main title may well serve to lure those who have to take their doses of business facts with a dramatic sugaring. Surely that title will recall to all except the younger generation those hectic days after the war when it was the coin of commercial conversation. His sub-title, "a study in the organization, planning and stabilization of trade," drab by contrast, when coupled with the name of the publisher, should prick the ears of the steadily growing portion of the business world which is trying to guide itself by the shadows of coming events, if not to cause the events themselves to occur.

Those who expect dramatic treatment of the subject, however, will be sorely disappointed, for, after a brief discussion of the "catchword complex," Mr. Lyon takes a nose dive into a cloud of historical business facts, showing the beginnings of hand-to-mouth buying away back in the sixties, and emerges into a veritable sea of data covering trade from raw material to consumer. The records of widely different industries are charted and discussed in a series of chapters, each taking up a specific phase of the whole problem. For example, one interesting chapter shows the change that has taken place in the size of orders over a period of years in primary industries, then in distributing units.

The author's approach is from the order as the basis of trade, from which point he traces the changes that have taken place over a period of which the "hand-to-mouth" period was an incident, the effect of these changes on stocks, costs, capital and other elements of operation. He proves clearly that while there is some lack of consistency, there is certainly a distinct trend, so great as to force the conclusion that a *permanent* change has taken place in the order basis which seriously impairs its soundness. But no substitute has as yet emerged to supplement or replace it and so provide solid ground upon which to stabilize trade.

Mr. Lyon leaves no doubt of his conviction that stabilized trade has evolved from a business problem into a social necessity. One is reminded of President Hoover's idealistic discussion of the social implications of engineered trade. Mr. Lyon's attitude may be sensed from two quotations. In the early pages he says, in discussing the economic setting, "The most dramatic conflict in American economic ideas is the struggle between our 'engineering' and our 'private enterprise' attitudes." Then, having developed his thesis that trade has become a social problem, he concludes that "the problem for society is the determination of the size unit which for each type of goods is the most economical to handle under the varied circumstances of trade and the devising of a method of determining the reward necessary for having goods handled in units of those sizes."

If Mr. Lyon's treatment of the data with which this book is replete is dispassionate, here—in his attitude—are dramatics aplenty. Certainly the "socialization of industry" has almost become our current catch-word, and serious-minded men will do well to read, mark, learn and inwardly digest what Mr. Lyon has set forth on the trend toward stabilization, even if they disagree with him on the problem of society as he sees it.

LUTHER MCG. MOYER.

How Close Is "Accurate"?

Gages and Fine Measurements. By F. H. Rolt. Two volumes, 5½ x 8½ in., illustrated. Macmillan Co., New York. Price $14.50.

Volume I, Standards of Length, Measuring Machines and Comparators. 366 pages, 254 figures.

Volume II, Limit Gages, Measuring Instruments and General Methods. 357 pages, 353 figures.

So far as is known to the reviewer this is the first comprehensive work on gages and length measurements of precision. The author is a well known British metrologist, and while it is published in two volumes, a third yet to be published will deal with the measurement of screw gages.

In the first volume all the various methods of measurement and calibration and the methods of manufacture of gages are given in considerable detail and with a number of illustrations. The author has impartially dealt with the equipment manufactured in America, France, Germany, England and Switzerland, and the volumes are profusely illustrated with all the more modern types of equipment.

The second volume is chiefly concerned with methods of checking limit gages and the various problems met in engineering practice. A careful review of micrometers and gages and methods of gaging gears, internal diameters and fitting of precision shop machinery enables the author again to describe the methods used throughout the world in an impartial manner.

This work is of particular use not only to those who are interested in fundamentals of measurements, but to all engineers that have to deal with modern production methods and interchangeability of parts. The accepted methods are explained in detail and the illustrations and figures are very helpful in indicating how particular measurements are made. Quite properly the author has left the details of limit gaging systems, gage tolerances and gage design to the published reports of the various national standardizing bodies. This renders Mr. Rolt's volumes more valuable as a reference work, since more space can be devoted to the principal methods of length measurement.

Of particular interest is the more modern applications of interferometry to the measurement of length. There is also a discussion of spirit levels, the use of which should be applied more extensively in practice. The use of the spirit level solves the difficulty of using large levers in multiplying the sensitivity of instruments, since a spirit level sensitive to 10 sec. of arc would have a radius of curvature of 170 ft. Of particular interest also are the methods of optical projection of small parts. By using good projection lenses a quick and accurate method of inspection of small screw threads, pinion gears and the like is made possible.

It is to be regretted that more space was not given to the description of extensometers. The Whiddington "ultramicrometer" and similar methods of measurement are described, which employ an oscillatory circuit and vacuum tubes and measure small mechanical displacements by

changing either the resistance or capacity of the circuit. The Peters "telemeter" is also described. Although these instruments are interesting and represent modern methods of measuring small continuous displacements, the well known strain gages and extensometers are not discussed.

A thorough appraisal of these instruments would be especially valuable at this time, in view of the growing tendency to standardize their use. These are also capable of the highest accuracy and sensitivity. One might cite the McKeehan and Cioffi extensometer developed in Bell Telephone Laboratories for studies of magneto-striction. It is capable of measuring strains of 2×10^{-9} to 3×10^{-5}, which, so far as is known, is one of the most sensitive extensometers ever developed.

It is to be regretted that a description of this remarkable extensometer was not included in the book. In this device the light from a lamp is transmitted through a grating having opaque and transparent stripes of equal width onto a concave mirror, and back again to another portion of the same grating, thus giving an image of the grating upon itself. As the mirror tilts the image moves, producing in effect a light valve or shutter. A lens collects the transmitted light and passes it onto a photoelectric cell and a sensitive galvanometer indicates the photoelectric current as a function of the displacement.

J. R. TOWNSEND.

One of the Least Known Metals

Tin Mining, Production, Technology and Applications. By C. L. Mantell. 366 pages, 6 x 9½ in., illustrated with photographs and line drawings. Chemical Catalog Co., New York. Price $7.

Tin is a subject in which there is a great deal of interest, both scientific and industrial, and concerning which none too much of an authoritative nature is published. This book covers the subject in a comprehensive manner and is of decided value to all lines of industry into which tin enters.

Dr. Mantell covers successively the history of tin, its physical and chemical properties and its production, distribution and consumption. Some of the subjects have been treated from the viewpoint of the metallurgical chemist rather than of the mining engineer. Useful information is given about the industrial applications of tin in plating, hot-dipped coatings, foil and collapsible tubes, including a chapter on plating which discusses the applications, the commercial plating baths and non-electrolytic methods.

For this age of alloys, a chapter of nearly 70 pages discusses this important subject and is brought to a close with a table listing the alloys which contain tin, giving the names and the composition. Secondary tin has been treated from the economic as well as the metallurgical and chemical side, and the same is true as to the chapter on the detinning of tin plate scrap.

Data on How to Weld

Arc Welding. Lincoln Prize Papers. Edited by E. P. Hulse. 760 pages, 5½ x 8 in., illustrated. McGraw-Hill Book Co., Inc., New York. Price $5.

There is always a time lag between revolutionary technical processes and published technical information about them. For that reason those who are familiar with the process become out of patience with other engineers and the public in general, because the latter are insufficiently informed, and appear to be obstructing progress. Anything which can be done to reduce this time lag tends to prevent misunderstanding and friction and promote progress on sound lines.

Fusion welding offers many alluring prospects for fabricating metal, especially steel structures. To reduce the time lag, and convince engineers and the public that electric arc welding will give us more and better structures, Lincoln Electric Co. offered through the American Society of Mechanical Engineers three large cash prizes for papers giving "new information that will tend to advance the art of arc welding." This book contains the three prize papers, the two that received honorable mention and two other outstanding papers, seven in all.

There may be some question as to whether much of the technical information in these papers is "new," that is, had not been published previously. The first, and longest, paper presents the advantages of arc welding, as to strength, saving in weight, labor, time and cost. Many examples of welded structures are very impressive, since after test no failure occurred in the welds. The claim is made that arc welding is superior to riveting in tension, bending, compression, shear, shock and reversal of stress; the proof, however, is not conclusive, as no data on riveted specimens are given.

The essentials of the design of welded joints are discussed quite fully and should prove of value to engineers contemplating the use of welding. Shop methods which facilitate the work and prevent warping are described and the saving in material and cost of welded compared with riveted towing targets is given.

The methods used in a large shipyard for proving that the welders can make welds having uniformly high tensile strength are given in detail. If all welders were qualified as they are at this shipyard, welding would undoubtedly make much more rapid progress.

After describing several large undertakings the advantages of welding a large freight ship are carefully worked out. In conclusion it is estimated that owners of welded ships would save $111,150,000 per year on 45,000,000 gross tons of water-borne commerce. This saving could be passed on to the public in lower freight rates. This carefully worked out estimate of the saving which can be made by welding should receive careful attention, as it is based on actual cost records.

The second paper attacks the problem in a different way. The strength and other properties of welded joints are analyzed and conclusions are drawn from tests carefully made in the laboratory. Impact and fatigue strength receive a great deal of attention. The application of the results to welded structures is brilliantly presented and the conclusion is reached that welded structures can easily be made which will never fail in the welds.

Investigational work of this kind must necessarily be the basis for the safe and economic use of welding and it is hoped that American engineers will recognize this need before it is too late.

The third paper gives the results of hydrostatic pressure tests to destruction on ships' bulkheads 12 ft. square. The welded specimens were found to have advantages over the riveted specimens. The author concludes that electric welding performed by competent men under close design and procedure control is fully as reliable as riveting, and will lead to very substantial savings in weight and cost and improve tightness and stiffness.

Other papers included in the volume describe rail joints successfully used in track which has no paving on the right of way; the welding of a long pipe line; the welding of an airtight room for testing boilers under forced draft; welding of steel T-bars to armor plate in connection with the protection of battleships against torpedo attacks; and the changes in design which welding has made desirable in the manufacture of truck switches for power houses.

It should be evident that this book presents in attractive form much of our present knowledge of electric arc welding. Emphasis is laid on the qualification of the

(*Concluded on page* 1434)

Silicon Alloys and Steel Melting

Equilibrium Diagram for Iron-Silicon Studied— Carbon Elimination and Oxidation in Open-Hearth Furnaces

THREE papers formed the backbone for discussion of steel properties at the Alloy and Steel Melting session of the American Institute of Mining and Metallurgical Engineers, in New York, Feb. 20. Prof. Bradley Stoughton and Earl S. Greiner, Lehigh University, presented a paper "Progress Notes on the Iron-Silicon Diagram." Alexander L. Feild, research engineer for Simonds Saw & Steel Co., Lockport, N. Y., discussed "Rate of Carbon Elimination and Degree of Oxidation of the Metal Bath in Basic Open-Hearth Practice." A paper, "New Method for Determining Iron Oxide in Liquid Steel," by C. H. Herty, Jr., J. M. Gaines, Jr., H. Freeman and M. W. Lightner was presented by Doctor Herty.

Iron-Silicon Equilibrium Diagram

IT has often been said in print that the iron-silicon alloys form a continuous series of solid solutions from 0 to 15 per cent silicon. This claim the authors are inclined to doubt: first, because the alloys from 0 to 4.25 per cent silicon are ductile and malleable at atmospheric temperature, while those with 5 per cent or more of silicon are comparatively hard and brittle. Furthermore, the alloys with more than 4.25 per cent silicon are comparatively hard and low in ductility at atmospheric temperature, but become much more ductile when heated slightly. It is well known, for example, that the alloy containing 4.75 per cent silicon will crack when sheared cold, whereas it will give a good edge if sheared in boiling water.

Each of the following compounds has been reported by at least two competent investigators: Fe_3Si, Fe_2Si, Fe_2Si_3, FeSi and $FeSi_2$. There is however, conflicting evidence as to all but one of these; namely, FeSi, which we may accept from the testimony of many. The others were discussed in detail in the paper and evidence given pro and con.

The difficulties of deciding which researcher is correct are due to the varying degrees of purity of the alloys studied by each, the uncertainty of chemical analysis caused by possible presence of SiO_2 in some residues believed to be pure silicide, the elusiveness of some change points in the equilibrium diagram, and the lack of knowledge of these pitfalls which has caused some investigators to report the presence of silicides on evidence not entirely convincing.

Possible Change of Phase

It was thought advisable to carry out some electrical resistance determinations on these alloys, with the object of determining if change points too slight, or too gradual, to be indicated by the other methods might not be located. This method has never been used before for locating change points in the equilibrium diagram of iron-silicon alloys.

It will be noticed that the line traced by Pilling is below atmospheric temperature in one part and very steep in another part. These conditions alone are sufficient to account for its not having been located previously as a change of phase, since investigators naturally do not normally cool below atmospheric temperature and since a line almost vertical in direction is extremely difficult to locate.

Results of the temperature-electric resistance determinations on all the alloys prepared, except the 8.57 per cent silicon alloy, were reported in the paper.

All alloys were made by melting 3.3 lb. of electrolytic iron and silicon of 97 per cent grade in magnesia crucibles. Heating was done in an Ajax-Northrup induction furnace and the alloys were held in the molten state for at least ½ hr. after the entire charge was melted. The stirring action of the eddy currents and the time during which the alloys were maintained liquid insured homogeneous melts. The alloys were sand-cast into bars about ⅝ in. diameter and 7 in. long.

The iron-silicon equilibrium diagram given in Fig. 2 is tentative, only, because some parts, particularly the area from 0 to 15 per cent silicon, require further research before being unconditionally accepted. However, while the part of the diagram below 15 per cent silicon is in part drawn on supposition, it does explain the brittleness of the iron-silicon alloys. The evidence for the existence of the various compounds was given in the paper.

Tentative Equilibrium Diagram

Fig. 2 exhibits four compounds, each of a different type. The com-

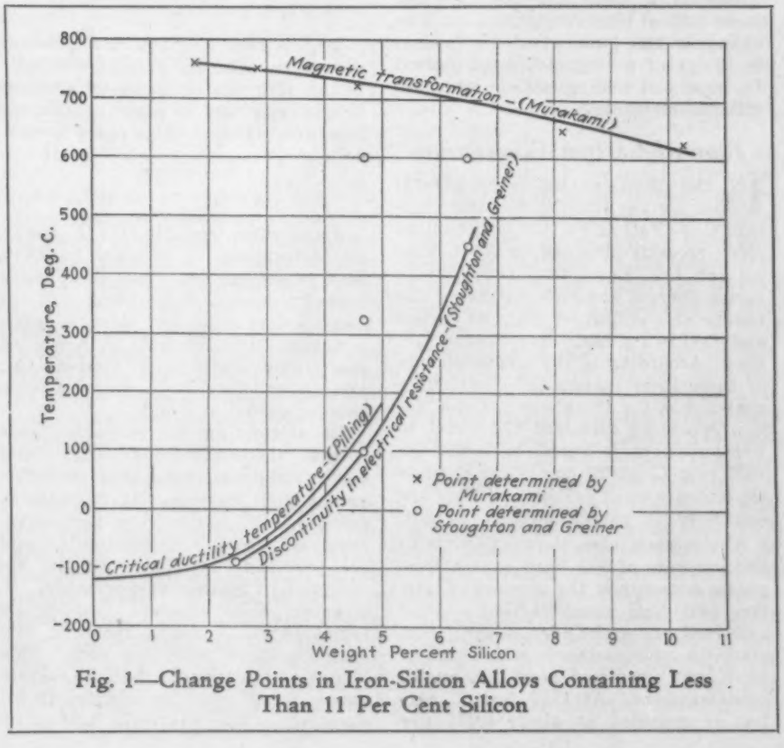


Fig. 1—Change Points in Iron-Silicon Alloys Containing Less Than 11 Per Cent Silicon

pound Fe_3Si is formed by a peritectic reaction between the melt and the solidus at *B*. Then a peritectoid reaction sets in at 1020 deg. C. (1868 deg. Fahr., line *DE*) between some of the Fe_3Si and FeSi to form Fe_3Si_2 according to the following reaction:

$$Fe_3Si + 3FeSi \leftrightarrow 2Fe_3Si_2$$

The Fe_3Si_2 can be decomposed by heating above the line *DE* while the Fe_3Si is decomposed when it is heated to the line *BN*. The compound FeSi exhibits a maximum in its melting point curve, which means that it is not decomposed on heating. The final compound, namely the $FeSi_2$, has a hidden maximum in its melting point curve.

While it must be remembered that there is yet some doubt as to the presence of Fe_3Si, $FeSi_2$ and Fe_3Si_2, there is more favorable evidence than unfavorable evidence of their presence. In view of this fact, the compounds were placed in the equilibrium diagram as shown in Fig. 2.

The alloys containing more than 33.3 per cent silicon have a comparatively simple constitution. A eutectic occurs at 45 per cent silicon and an intermetallic compound at *M* ($FeSi_2$). There is only 5 deg. C. difference between the temperature of the eutectic *P* and the melting point of the $FeSi_2$ at *M*. The phase theta is a solid solution of $FeSi_2$ in Si.

From the preceding discussion of the equilibrium diagram of the iron-silicon system, it is seen that certain parts are well established, while other parts are somewhat doubtful. To understand the effect of other elements on the constitution of the binary system Fe-Si, it will first be necessary to understand thoroughly the constitution of the binary system itself. There is a possibility of effecting some radical transformations, such as changing the position of the phases in alloys of a certain silicon content by means of adding one or more additional elements.

Rate of Carbon Elimination

IN the light of the experimental data on equilibrium for the reaction C + FeO = Fe + CO in molten steel, recently obtained by A. B. Kinzel and J. J. Egan, it is necessary to revise current theories regarding the nature of equilibrium between carbon and FeO in the basic open-hearth furnace. According to the measurements of these investigators the equilibrium constant *m* for the above reaction for a pressure of dissolved CO equal to 1 atmosphere is equal to 0.0005 at 1550 deg. C. (2822 deg. Fahr.), when concentrations of carbon and FeO are expressed in percentages by weight.

Their work also shows that, with the pressure of CO fixed at 1 atmosphere, not only is the product of carbon and FeO constant, but carbon and FeO are each independently constant—a circumstance which might have been predicted from theoretical considerations. At 1550 deg. C., carbon is constant at about 0.025 per cent and FeO at about 0.020 per cent, with the pressure of dissolved CO equal to 1 atmosphere, the product of these two constants being equal to the originally mentioned constant of 0.0005.

Oxidizing Out the Carbon

Summarizing his paper, Mr. Feild placed upon the blackboard the equation:

$$\underset{x}{C} + \underset{y}{FeO} = \underset{1}{Fe} + \underset{P}{CO}$$

Considering the quantity of iron a unit, he used the symbols x and y for carbon and iron oxide respectively and stated that the CO present is proportional to the pressure *P* under which it exists. Differentiating this equation with regard to time, we have:

$$-\frac{dx}{dt} = k\,(x\,y - m\,P)$$

In this case k is the rate constant, depending upon the rate at which the action represented in the first equation takes place; m is the equilibrium constant, which in some cases is equal to $\frac{x\,y}{P}$.

Some years ago Dr. C. H. Herty, Jr., determined m as equal to 0.016. In a paper two years ago the present author reported it as being 0.01, or slightly less than Dr. Herty's determination. Still later A. B. Kinzel of the Union Carbide & Carbon Co., Long Island City, N. Y., found a much smaller value, at 0.0005.

In attempting to reconcile these several determinations Mr. Feild came to the conclusion that when the open-hearth bath is flat it contains dissolved CO under very high pressure. Dr. Herty's determination and his own had been based on the assumption of atmospheric pressure. If, however, this pressure reaches 20 atmospheres, it might reconcile Mr. Kinzel's figure with his own. This brings up the thought that the correct values for *P* must be inserted in all equations of this character in place of the unit value of 1 atmosphere heretofore assumed.

Conclusions

Overoxidation of the metal bath during refining by the basic open-hearth process is an inherent feature. It may be reduced to a minimum only by obtaining a relatively slow rate of carbon drop and by the maintenance of a slag as low as practicable in effective FeO content. Sufficient data are not available to determine whether or not a heat is in better condition with respect to FeO during a very slow boil than it is after it has come to practical equilibrium under the "flat" slag which characterizes completion of the boil—carbon content, FeO content of slag and temperature being the same in both cases.

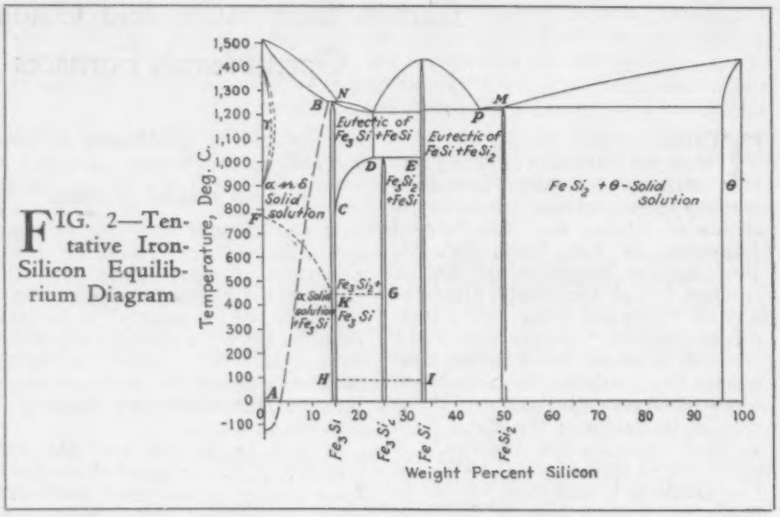


FIG. 2—Tentative Iron-Silicon Equilibrium Diagram

Determining Iron Oxide in Liquid Steel

FEW subjects have attracted the attention of metallurgists more than oxygen in steel. From the days of Mushet and Ledebur interest in this subject has been increasing and, as additional knowledge has become available, the problem has naturally grown more complex. Instead of using the simple term "oxygen" we now distinguish between iron oxide, silicates of various kinds, oxysulphides, oxygen as gas and oxygen in solid solution in steel.

There are five general methods for determining oxides in steel; hydrogen reduction; vacuum fusion; various wet-extraction methods, including electrolytic methods; methods depending on volatilization of the iron away from the oxides; and metallographic methods. For oxygen in solid steel each of these methods has both advantages and disadvantages.

To Obtain the True Value

The object of the present investigation is to obtain a true value of the oxygen content of liquid steel. If the steel has not been deoxidized, the greater percentage of the oxygen is

present as iron oxide in solution. A. L. Feild has referred several times to the differentiation of FeO and iron silicates in liquid steel, but before the addition of deoxidizers the amount of ferrous silicates is probably very small compared to the amount of FeO present.

When undeoxidized, or partly deoxidized, steel solidifies, considerable quantities of gas are given off, of which CO is the major constituent. There has been considerable discussion as to whether this gas is derived from CO dissolved in the steel or from reaction between carbon and iron oxide at the time of solidification. This question was discussed during the presentation of a paper by A. B. Kinzel and J. J. Egan, showing that the gas was probably derived from the reaction $C + FeO \leftrightarrow CO + Fe$, which takes place at the time of solidification.

Obviously, a loss of CO on solidification would give a test piece lower in oxygen than the liquid steel from which the test was poured. With this in mind, one of the present writers suggested the precipitation of the dissolved oxygen as Al_2O_3 by deoxidation of the liquid steel with aluminum. The analogy between this method and the ordinary sulphur determination is readily seen.

Aluminum reacts with iron oxide in steel as follows:

$$2Al + 3FeO \rightarrow Al_2O_3 + 3Fe$$

This reaction is very rapid, and results in the formation of refractory Al_2O_3, which is easily determinable by simple chemical analysis.

Sampling the Steel

A test-spoon is well slagged, and as soon as the steel sample is withdrawn from the furnace about 5 in. of ¼-in. aluminum wire is thrust into the steel. This amounts to about 1 per cent Al in a 2½-lb. test. It is best to avoid putting the aluminum wire into any slag on the spoon, as this causes a decrease in efficiency of the aluminum addition. As soon as the aluminum has been added, the steel is poured into a small mold 1¾ in. square at top, 1¼ in. square at bottom, and 2½ in. deep (inside dimensions).

It has been found advisable to use a sink head with this mold, and in Bureau of Mines practice the mold casting is simply made with a 2⅜-in. square section on top of the 1¾-in. square top of the mold; this section is 1 in. high and gives a sufficient amount of feeding to prevent piping in the small ingot. The test ingot is bored from the bottom with a ¾-in. drill and it has been found advisable to go well up into the test piece. Studies of segregation of Al_2O_3 in these small tests show that there is irregular distribution in the piece. It is therefore advisable to take as many drillings as possible, to insure getting a representative sample.

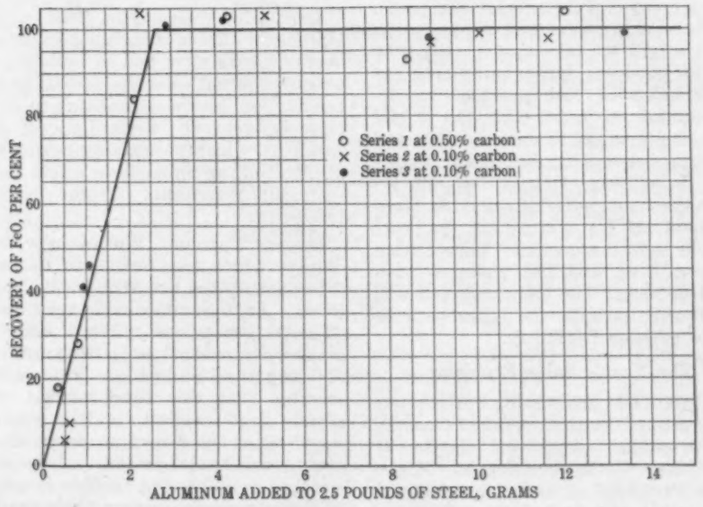


Fig. 3.—Effect of Excess Aluminum on Determination of FeO in Steel

An unkilled test is poured with each killed test and is used as a blank for the FeO estimation. By analyzing the unkilled test in the same manner as the killed test, the insoluble residue in the steel, together with the blank on the reagents, is obtained. In most work there is no need to run such a duplicate test on every sample. As a rule the blank has about 4 per cent of the total alumina found in the killed test.

Effect of Excess Aluminum Added

To determine whether complete deoxidation had occurred when the aluminum was added, also to obtain the effect of excess aluminum on the oxygen content of the steel, three series of tests were taken from a basic open-hearth heat, the first series at 0.50 per cent carbon, and the second and third at 0.10 per cent carbon. Six samples were taken in each period. The aluminum was added as ¼-in. pure aluminum wire, and the amount added was obtained by weighing the wire before and after use.

After a certain amount of aluminum had been added the amount of Al_2O_3 obtained was practically constant, and an average of the determinations giving approximately constant results was used to designate complete deoxidation. The percentage of FeO determined by various additions was then calculated by dividing the Al_2O_3 obtained on a given test by the average Al_2O_3 as shown above, and the results were plotted in Fig. 3.

This figure shows that, up to 2.5 gm. of aluminum, the amount of FeO recovered was directly proportional to the aluminum added to a 2½-lb. test. After this amount had been added there was no increase in FeO content of the metal shown, indicating (1) that essentially complete deoxidation had been obtained, for if the rate of reaction between added aluminum and the iron oxide were too slow to give the total amount there would be a gradual increase in Al_2O_3 content with increasing aluminum additions; and (2) that excess aluminum in the metal causes no increase in apparent oxygen content of the metal by deoxidizing the slag in the spoon or by atmospheric oxidation of the contained aluminum.

As seen in Fig. 3, the results were consistent and indicate that the method is entirely satisfactory, provided an excess of aluminum is added.

Open-Hearth Tests

After a number of determinations of FeO had been made on steels, both in the laboratory and in the plant, it was decided to follow a complete heat, determining the FeO content of the metal from melt-down to tap, and to obtain as wide a range of iron-oxide content as possible. A basic and an acid heat were investigated. Both heats were charged to melt high in carbon and were worked down to about 0.10 per cent carbon before tapping.

On these heats the main point at issue was to try the method for determining iron oxide rather than to attempt to obtain a steel low in iron oxide. Complete records on these two heats are not given in the paper, but they furnished the basis for several curves, which were discussed by the author.

Solubility of Al_2O_3 in acids depends upon the time of contact with the acids, according to a statement of Thomas S. Cunningham, Union Carbide & Carbon Co., Long Island City, N. Y. This point was discussed back and forth between Mr. Cunningham and Dr. Herty in connection with a statement by Dr. Herty that Al_2O_3 was found virtually insoluble. A. B. Kinzel brought up the question of the essential accuracy from the quantitative standpoint of various tests which have been made. There seems to be no difference of opinion regarding the qualitative results, but from the standpoint of quantity investigators have differed.

Management Is Challenged

With Price Trend Downward, Greater Efficiency Is Needed to Maintain American Industrial Supremacy, Says Dr. Friday Before Taylor Society

SCIENTIFIC management will be the leading factor in maintaining American industrial supremacy during the next decade, according to David Friday, economist, A. G. Becker & Co., New York investment bankers, speaking before a meeting of the Taylor Society at Columbus, Ohio, May 2.

In a forecast of management problems in the next ten years, Dr. Friday pointed out that the trend of commodity prices since 1920 has been generally downward. This trend has been arrested in times of prosperity and resumed again in periods of depression. With the continually increasing efficiency of labor and management and consequent enlargement of production, only a sharp increase in the supply of gold and thus a readjustment of the credit structure could disturb this trend.

Dr. Friday emphasized the futility of trying to maintain prices by means of pools, cartels and the like. Recent history has proved that products so manipulated have suffered most severely by price declines. Wages are likely to be maintained at about the same level and, if the profit margin is held, industry must look to increased efficiency of management for its earnings. Although the downward price trend seems likely to be most marked in the non-agricultural group, agricultural prices will also drop as farm population decreases and production increases.

But Dr. Friday feels that industry will meet the challenge. He pointed out that, while the net profits of mining and manufacturing corporations reached 5.5 billions in 1920 and fell to 1.3 billions with the decline of prices in the following year, they had climbed to 7.2 billions in 1929 with a lower commodity price level in effect. This is explained by increased production, which has been made possible by the more effective utilization of labor by management. Dr. Friday believes that this tendency will continue as commodity prices decline.

The problem of disposing of our increased production will be solved by larger exports, increased buying power of the masses and development of new products. While America will constantly meet keener competition in world markets, the superior industrial technique assures a growing market for our manufactured goods for at least another decade. The increased buying power of the masses is assured, as wages will be maintained and lower prices will enable the workers to buy more. Added to this will be the increase of industrial dividends.

The speaker ventured no guess on what might be developed in the way of new products, but pointed out that the solution of such problems as the elimination of noise and dirt would give employment to many people and perhaps become an important industry. In closing, Dr. Friday emphasized the importance of scientific management, if his picture of the next decade is to materialize. Competition will be keen and the business man must be alert. The small concern will profit equally with the large because of its greater flexibility.

The Year's Sales Problems

ALTHOUGH forecasting for the immediate future, Frank Goodell, vice-president, Anderson, Davis & Hyde, New York, speaking on "Major Sales Problems of 1930," emphasized the feeling of uncertainty and confusion in the present situation.

"Supply and demand," he said, "are obviously out of balance. Growth in consumption, while substantial, has lagged far behind normal production capacity. Actual production is now substantially less than normal capacity and vastly less than potential capacity. Under the stimulus of science this potential will continue to increase and affect our factories and farms, and speed up such services as transportation and management.

"While the principles which govern increased productivity are relatively few, scientifically defined, quickly resultful and limited only by the capacity of the human mind, the factors which govern consumption are manifold, often indirect, characteristically slow moving and easily thrown out of balance. Unused production capacity will continually seek an outlet and, because it cannot always be held in check, supply and demand will remain out of balance. Thus an indefinite continuation of the buyer's market appears likely."

Developments that have been taking place within the major economic trends and are at the base of the major economic sales problems of 1930 were outlined by Mr. Goodell as follows:

Unemployment: It easily ranks first. The state of employment during 1930 will have a direct and vital bearing on the sales problems of this and future years. Government and industry are now deeply concerned and are acting in unison.

Decline of Commodity Prices: The temporary effects of such a pronounced decline as we have had in agricultural products is not only disturbing to the farmer but also a depressant to business in general. Regardless of the extent to which purchasing power has diminished, an immediate effect is to restrain merchants from buying freely.

Buying Fatigue: We are now in a market which has for years received the concentrated fire of intensive sales effort. Last summer the very peak of good times was reached and the market commenced to show symptoms of being tired and jaded. It is inconceivable that this tired market will remain tired indefinitely. It is a characteristic of the American people that, given reasonable periods of adjustment, they will spend surplus incomes to the utmost in raising their standards of living.

Mr. Goodell suggested the following attacks for the above problems: Intelligent use of current employment indices as a factor in production and marketing; closer adjustment of sales problems to the declining trend of commodity prices, particularly as manifested in a more intensified hand-to-mouth buying; planning to conform to trends instead of trying to buck them; adjustment of product to increase demand and decrease buying resistance; basing of sales policies on facts obtained by surveys, economic analysis and intensive study of each problem in its relation to other problems; closer cooperation between manufacturer and his retail outlets; increasing caliber of representatives and salesmen; raising level of merchandising strategy; planning for long run rather than for present, and selling of merchandising plan rather than merchandise itself.

In a paper on "Basic Conditions of Effective Utilization of Facilities," Leslie E. Bryant, mechanical engineer,

Armstrong Cork Co., Lancaster, Pa., indicated that the factors which make effective utilization possible are really the basic principles of scientific management.

He enumerated these conditions as follows: A comprehensive plan or purpose for the organization, standardized conditions, interrelated or balanced equipment, knowledge of the science of processing the product, methods consciousness, control, supervision, definite product, definite quantities, uniform material control, payment for performance, maintenance of standards, attitude, selection of personnel and leadership. These conditions will be taken up in greater detail in an abstract of Mr. Bryant's paper to be printed in a succeeding issue of THE IRON AGE.

The importance of obtaining the best possible material for a given use and establishing that material as a standard for the job was brought out by E. C. Brandt, Westinghouse Electric & Mfg. Co., East Pittsburgh, in a discussion of maintenance of material and equipment standards.

He cited the effective work of the automobile industry in setting up materials standards and urged such procedure in other fields. Any company can afford to pay more for material if it is certain the best is being obtained and that it is up to certain fixed standards. Mr. Brandt pointed out that the Westinghouse company has set up definite specification numbers for all the materials and equipment that it buys and that it has thus been able to delegate 3000 out of its 50,000 employees to order material and equipment as it is needed in their departments. In some cases it has been necessary to provide inspection in the vendor's plant, but Mr. Brandt indicated that this was not lack of confidence but rather increased cooperation.

Citing individual examples of saving by standardization, Mr. Brandt stated that the company was once forced to maintain a 3.8 months' supply of tool steel. With the adoption of standard materials this has been reduced to 1.7 months' supply. The speed with which the Westinghouse company cooperates with others in adoption of standards was illustrated when the machine tool builders adopted a standardized paint. Within three days all electrical fixtures and supplies for machine tools made by the company were repainted to conform to this specification.

The setting up of standards, according to Mr. Brandt, has brought added responsibility to the engineer. He can no longer design equipment and products merely according to whim but must take into consideration everyone who will have anything to do with its operation or with its use.

In further discussion of the subject, with emphasis on equipment standards maintenance rather than materials, Victor S. Karabasz, assistant professor of industry, Wharton School of Finance and Commerce, University of Pennsylvania, Philadelphia, stressed the need for continual preventive inspection if plant equipment is to be maintained at the highest state of efficiency. Improved methods of lubrication are also contributing to the better maintenance of equipment.

General Administrative Control

"THE function of administrative organization and control is to marshal and integrate the known facts of psychology and economics for the utilization and correlation of the human and material resources of a given enterprise."

In this manner Frederick L. Lamson, assistant to the president of the Kendall Co., Boston, introduced the plan of organization that has been developed during the last year by the Kendall Co. in the operation of textile mills in the South and its other units.

The factors making this possible apply to other industries as well. Mr. Lamson enumerated them as follows: Constructive leadership, development and application of sound policies, recognition and varied application of research, intelligent selection and utilization of executive personnel, emphasis upon the training function, definition and development of responsibility, effective motivation of the organization, and means for measuring actual results against well-set standards.

"The building of a strong personnel is the best investment a growing business can make," said Mr. Lamson. "Leadership in industry often breaks down because management fails to use the processes of education in building up the organization. The organization plan of the Kendall Co. provides for developing leadership through a staff committee, a body of seasoned executives of broad experience not only in their particular business but in general industrial trends and problems."

¶ The problem of disposing of increased production will be solved by larger exports, increased buying power of the masses and development of new products.—*Dr. Friday.*

* * *

¶ "Last summer the very peak of good times was reached and the market commenced to show symtoms of being tired and jaded. It is inconceivable that this tired market will remain tired indefinitely." —*Frank Goodell.*

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¶ While the principles that govern increased productivity are relatively few, the factors governing consumption are manifold and easily thrown out of balance.—*Frank Goodell.*

* * *

¶ A company can afford to pay more for material if assured that it is the best obtainable and is up to certain fixed standards.—*E. C. Brandt.*

* * *

¶ Standardization has reduced Westinghouse's stock of tool steel from 3.8 to 1.7 months' supply. — *E. C. Brandt.*

* * *

¶ "Leadership in industry often breaks down because management fails to use the processes of education in building up the organization."—*Frederick L. Lamson.*

The General Electric Co. announces the CR-2992-A-1 thermostat for use with industrial heating units where very close control of the temperature is not required. The new device is available in three principal ratings, and the operating ranges are (1) 60 to 200 deg. Fahr.; (2) 150 to 300 deg. Fahr., and (3) 250 to 400 deg. Fahr.

Inspection Bureau Formed in Chicago

Inspecting and purchasing engineers have formed the Material and Equipment Inspection Bureau, with headquarters at 332 South Michigan Avenue, Chicago. Francis L. Harris is in general charge of the purchasing division and B. C. Rinehart of the engineering division.

Inspecting, appraising, purchasing and consulting work will be pursued with regard to mechanical, electrical, structural and chemical engineering and materials. The purchasing division will maintain files on materials and equipment for disposal outside of regular established sources, including auction sales, liquidations and other sources.

Wachs, Gregg & Co., 117 North Jefferson Street, Chicago, have been made exclusive representatives in the Chicago territory for the Bradford Machine Tool Co.'s line of lathes.

Automobile Outlook Is Uncertain

Business Is Poorly Distributed, with Ford and Chevrolet Accounting for Two-Thirds of Present Production —Sentiment Conservative

DETROIT, May 5.—Automobile demand, although considerably smaller than a year ago, is rising to a seasonal peak. Spring buying has been retarded this year, and it now seems likely that retail sales, which are usually largest in April, will reach their zenith in May.

Whether this will mean that current production rates will be maintained or even expanded is a question that events alone can answer. With motor car business poorly distributed among different builders and with unemployment still severe in this city, sentiment in the industry is exceedingly conservative. Sales executives of certain automobile companies lean to the view that April will prove to be the largest production month of the year and that the summer decline in operating schedules will be even more severe than the curtailment that followed the stock market crash. With the mid-year bringing out of new models, however, a revival of activity is looked for in September and October, but judging by experience in past years, neither of those months will compare with the peak spring month, and last half output as a whole will fall short of first half performance.

Predictions Frowned Upon

MANY local observers refuse to hazard any prophesies. Predictions are rather generally frowned upon, since developments of the last few months have demonstrated the limitations of sales forecasts. This year, in view of business depression and losses suffered in the stock market crash, it has been exceedingly difficult to measure potential buying power. No one knows whether the ultimate consumer can or will buy, and, if he knows, he won't tell.

One of the enigmas of the situation is the current concentration of activity among makers of low-priced cars. Automobile demand has always been regarded as a correlative of employment; yet, with many men out of work throughout the country, sales of Fords and Chevrolets are proportionately far in the lead.

The explanation offered by a sales official of an important motor car company is that "Ford is robbing the whole field." Caution, engendered by uncertain business conditions, is believed to have caused many a buyer who would otherwise purchase a medium-priced or high-priced car to make a smaller investment. This is thought to be particularly true of those buying a second car, to supplement a finer car.

A Staple Industry

ONE encouraging lesson of the period that has followed the Wall Street panic is that automobile manufacture has proved that it is a staple industry and not a highly volatile, fluctuating "luxury" business. Although one of the most common observations here is that the one thing the motor car industry needs most is stability, this refers to the widely varying fortunes of industrial manufacturers and not to the total volume of production, which compares favorably with that of other years outside of 1929. Output in the first three months of this year was only 10 per cent short of the performances of 1924 and 1926, which stand next to 1929 in their first quarter totals.

It is becoming more and more evident that the individual car maker is at the mercy of popular fancy. Style is important and body lines and color are being given increasing attention. Mechanical improvements also influence sales. Such a simple move as adding two cylinders to a power plant already amply efficient is frequently highly productive of business, as is evidenced by the growing vogue of "eights." Automobile sales departments now carry the greatest responsibility in the industry. They are the eyes and ears of their companies, constantly watching competition in all its manifestations and appropriating or adapting every idea that appears likely to improve the demand for their products.

Competition Intense

THE intensity of competition is reflected in all branches of the industry. It reaches the suppliers of automotive parts. A leading motor car manufacturer asks parts makers to furnish data covering material costs, labor costs, overhead and profits. If the material costs are considered too high, this company undertakes the purchase of the materials for the parts maker.

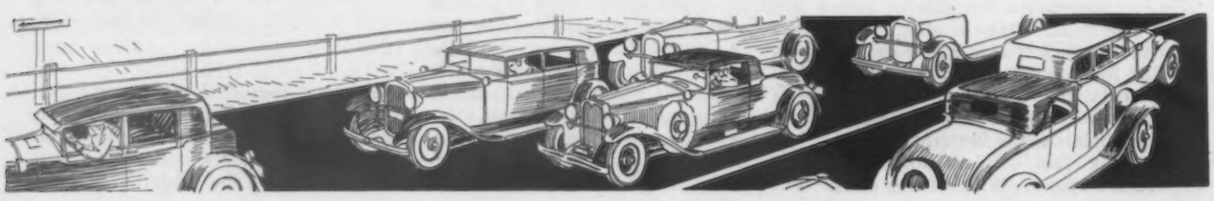
Pressure against finished steel prices is severe, but it has come as much from the sellers as the buyers. The mills' need for tonnage has apparently outweighed considerations of price stability. As a result, prices are soft, although no further general reductions have occurred.

A favorable aspect of the Detroit situation is that there are no accumulations of steel in the hands of motor car builders. Production schedules are being kept in close step with sales and steel specifications are being cut or expanded accordingly.

Steel Not Analogous to Copper

ALTHOUGH Detroit is the "No Man's Land" of the steel market, the trade here is well aware of the fact that finished steel, in contrast with copper, has been declining for many months and hence the present positions of the two products have nothing in common. Automobile body sheets, at 3.80c., Pittsburgh, and black sheets, at 2.55c., are $6 a ton lower than a year ago, while wire nails are down $10 a ton.

On bars the Cleveland base rules. To meet the Cleveland price of 1.80c., Pittsburgh makers must quote 1.74½c., since Cleveland has a freight advantage of 5½c. a 100 lb. on shipments to Detroit. Whether this differential will be widened or narrowed under the new mileage scale rates that go into effect May 20 is still uncertain. Tentative schedules indicate



that the Pittsburgh rate will be reduced 2½c. to 26½c. and the Cleveland rate 3½c. to 20c., which would increase the differential to 6½c.

Detroit Base Forecast

THE growth of local steel capacity has caused some enthusiasts to predict that Detroit will have its own basing point on certain products within five years. The Michigan Steel Corporation here and the Newton Steel Co. at Monroe, Mich., have a combined capacity of nearly 40,000 tons a month, largely automobile body sheets, and the Great Lakes Steel Corporation is completing six open-hearth furnaces and capacity in semi-finished material, bars and strips. The Ford Motor Co. is credited with producing 95 per cent of its own requirements in alloy steel bars, estimated at 15,000 to 20,000 tons a month.

Ford's steel output, incidentally, has resulted in a change in blast furnace practice. Formerly pig iron running rather high in silicon was made to suit the requirements of the company's gray iron foundry, but now it is essential to make both basic and foundry grades. As a consequence the Ford company has become a large user of silvery iron, having recently purchased 5000 tons of 7 to 8 per cent material for shipment by water.

Ford and Chevrolet Get Lion's Share

PRODUCTION of Ford and Chevrolet cars is now running at from two-thirds to three-quarters of the entire output of the industry. Ford has recently averaged better than 8500 motors a day and aims to reach a total of 9200, running five days a week. The Chevrolet company made 85,000 to 90,000 cars in April and plans to produce 110,000 in May, although this schedule may be revised upward or downward in keeping with the trend of retail sales. Of late Chevrolet output has averaged about 4500 motors a day.

Among the other makes, the Plymouth has made the best showing, 11,000 having been produced in April and an equal number being scheduled for manufacture in May. This car accounts for nearly half of the production of the Chrysler Corporation, the May schedules for other cars totaling 13,000.

The poor earnings reported by some of the motor car companies this year are not accounted for entirely by the decline in their operations. A number of them are known to have piled up large profits in 1929 by lending on the New York call money market.

Foundry melt in Michigan is spotty. Shops serving Ford and Chevrolet are busy, while those supplying castings to other motor car makers are less fortunate.

The Ford company is said to be farming out more work than ever before in its history. One reason given is that the present model requires much more machining than the Model T.

Water shipments of finished steel to Detroit have already got under way, two cargoes from Chicago having recently arrived.

¶ Ford is making more than 8500 motors a day and aims at an output of 9200.

* * *

¶ Chevrolet is credited with April output of 85,000 to 90,000 and plans to make 110,000 in May.

* * *

¶ Production of other makes, outside of the Plymouth, is unimpressive.

* * *

¶ Seasonal peak in buying has come later than usual.

* * *

¶ Steel stocks of motor car builders are low and specifications are in tune with retail sales.

* * *

¶ Steel prices recognized as having undergone a long decline, in contrast with copper, which was held unchanged for a year.

Building Outlook Poor

THE building situation in the Detroit district is still unfavorable. Few sizable projects are under consideration. The Bryant & Detwiler Co., Detroit, is low bidder on the general contract for a municipal filtration plant and pumping station requiring 1800 tons of structural steel and 2000 tons of reinforcing. An addition to the Detroit *News* building will call for 1800 tons of structural steel, and a projected auditorium at Grand Rapids, Mich., will take 500 to 1000 tons. Smaller fabricators report moderate seasonal improvement in small jobs.

Highway work does not offer an outlet for steel, since the Michigan State roads are not reinforced. Competition for reinforcing work is keen, with rail steel bars replacing billet bars to an increasing extent.

Subscribers to Standard Specifications

Lists of Federal and commercial specifications on various products, and of manufacturers who have expressed willingness to certify to purchasers that materials supplied are based on those specifications, have been issued by the Division of Specifications, Bureau of Standards, Washington. The so-called "certification plan," described and explained in miscellaneous publications No. 105, Bureau of Standards, is intended to make effective the benefits of mass production, distribution and consumption by encouraging producers to make staple commodities, complying with nationally recognized specifications.

Ninety trade associations are listed as having been active in the work of formulating the Federal and commercial specifications, and 2074 companies are listed as willing to certify that products made by them are to Federal specifications. This total includes 50 producers of abrasives and polishing materials, 33 manufacturers of builders' hardware, 70 makers of packing and gaskets, 60 manufacturers of pipe and fittings, 49 makers of metal tubing, 15 producers of wire rope, 13 manufacturers of wood screws and 57 producers of refractories.

In circular No. 256a, available through the Bureau of Standards only to Governmental and institutional purchasers, Federal, State, County and municipal, a list is given of the companies willing to supply commodities covered by Federal specifications. Letter circular No. 277, which is for general distribution, comprises a list of producers willing to supply commodities covered by certain commercial standards.

Continuous Sheet Rolling Shown in "Armco" Movie

Motion pictures of the continuous sheet mill at the Middletown, Ohio, plant of the American Rolling Mill Co. were presented by the company and the Philadelphia members of the Armco Distributers' Association at a dinner in Philadelphia, April 30, at the Penn Athletic Club.

The film shows remarkable views of an open-hearth furnace in operation and carries the observer through the continuous sheet process from a 12,000-lb. ingot, reduced to 2000-lb. sheet bars and rolled continuously into sheet strip 200 ft. in length. At one point in the process the camera travels on a crane over the mill, following the sheet bar through the various reductions into a strip sheet.

Bennett Chapple, vice-president of the American Rolling Mill Co., introduced the film by outlining the growth of the company, the beginning of the development of the continuous process about 14 years ago and by suggesting something of the possible future use of sheets. G. W. Breiel described the scope of the Armco Distributers' Association. W. S. Stephenson, Philadelphia district sales manager of the American Rolling Mill Co. introduced the speakers.

International Derrick & Equipment Co., Columbus, Ohio, has moved its New York office to 90 West Street. A. L. Worack is district manager.

New Equipment for the Foundry

ADDITIONAL foundry equipment to be shown at the twenty-third exhibition of the American Foundrymen's Association at Cleveland, May 12 to 16, not described in the special foundry section of THE IRON AGE, May 1, is displayed on these two pages. The exhibition of more than 225 companies is to be housed in the spacious Cleveland auditorium.

Melting Conveyor with Vibrating or Shakeout Screens

AMONG the achievements of the past year, as reflected by the exhibit of the Link-Belt Co., Chicago and Philadelphia, at the foundry show is a mold conveyor with vibrating or shakeout screens. The illustration covers the shakeout end of one of these screens. It shows the drive end of the conveyors and a view through the cooling tunnel. The molds are pulled from the conveyor on to the screens. Sand is riddled through the screens to the belt conveyor which feeds an elevator which discharges into mixers. The castings are discharged on to a conveyor which is moved in front of the screens. The hoods overhead are for a ventilation system which exhausts dust and smoke.

Electrical Metal-Pouring Unit

AN unusual machine designed for handling ladles of metal up to 1000 lb. is shown in the illustration. Made by the Modern Pouring Device Co., Port Washington, Wis., this machine has rack-and-pinion raising mechanism and planetary-gear power mechanism. Push-button control (shown at left, above the ladle) permits raising the load without interrupting the flow of metal. The complete device is rigid from the trolley to the bail of the ladle. This permits quick and accurate spotting of ladle over gates. There is an overhead swivel, permitting rotation through the full 360 deg. All the carrying parts are of steel and all working parts are fully inclosed. This machine will operate with a 2-ft. lift in a headroom of 8 ft., 9 in., and correspondingly for greater headroom. Putting the push buttons on a rigid member, as shown, does away with dangling cords.

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Special Battery for Trucks

A NEW type of battery for trucks and other foundry equipment is offered by the Electric Storage Battery Co., Philadelphia. It is known as type TL Exide-Ironclad Battery. It has been designed to meet service conditions requiring batteries of large capacity for electric truck and locomotive service. It is 20⅛ in. high, in sizes from 15 to 29 plates inclusive. Its kilowatt hour capacity is 43 per cent greater than that of the smaller type battery known as MVA.

Another advantage of this new type is that a smaller size cell in length and width may be used to obtain the same capacity as a larger size MVA battery, thus saving in square area of battery compartment.

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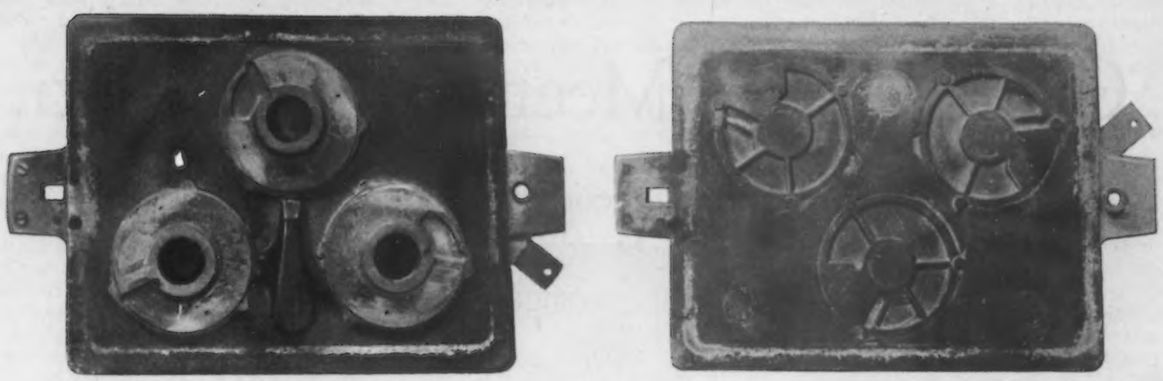


New Method of Mounting Loose or Gated Patterns

AMONG several new devices for mounting loose or gated patterns, made by the Stone Pattern Mount Co., Inc., Bloomfield, N. J., those illustrated show a squeezer-plate compound pattern mount, off of which more than 14,000 molds have been made. Five hours of labor sufficed in the production of this squeezer plate.

One of the two illustrations shows the mounted metal patterns, or the cope side; and the other represents the compound or drag side. The company says this is an entirely new process of handling short and long-run, loose or gated patterns, thus placing them on a production basis at the cost of only a few hours of labor.

The company has smaller mounts also from which 60,000 molds have been made. Some of the other types, not here illustrated, will be shown at the exhibition.

Tumbling Mill with Roller Bearings

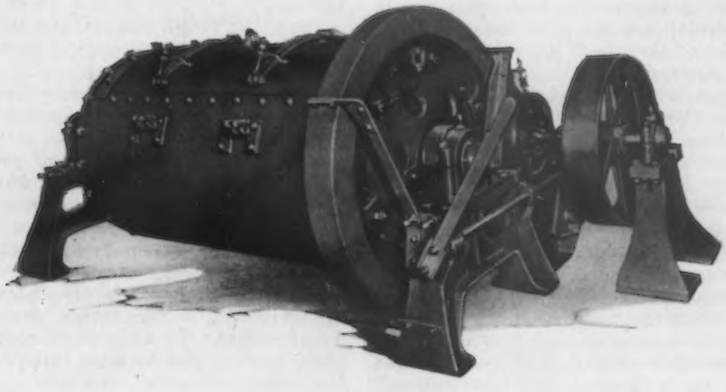
A HEAVY-DUTY tumbling mill, built according to modern machine design and having roller bearings, twin-disk clutch and other new features, has been brought out by the W. W. Sly Mfg. Co., Cleveland. The trunnions are of forged steel, machined and ground. Trunnion bearings and shaft bearings have Hyatt rollers.

Ball-and-socket type, self-alining pillar blocks are used. The heads are cast iron, ribbed to support the head plates, and arranged for automatic discharge of refuse lodging between the head and head plate. They have Venturi-type air passages for removal of dust without reaching the bearings.

Head plates are steel plate sections, split for easy replacement and reinforced around the circumference by a flange on the head, and radially by ribs on the head. They have slotted perforations.

The benches are heavy cast iron sections with wide feet. The barrel is a heavy steel plate rolled cold into a circular sheet. The door extends the entire inside length of the mill, for easy loading and unloading. The door lock is permanently attached to the door, so that there are no loose parts. This operates quickly and clamps door and shell together into one rigid unit during tumbling.

There is single lever control for the clutch and brake. The brake is of the friction contracting type. Positive pressure lubrication is provided throughout.



Electrical Monorail Hoist

A NEW line of electric hoists, with capacities ranging from ½ to 10 tons, is announced by the Milwaukee Electric Crane & Hoist Corporation, Milwaukee, a division of the Harnischfeger Corporation. One of these hoists is shown in the illustrations. It is equipped with roller bearings throughout. Other features of construction are forged, heat-treated gears and pinions, forged steel wheels and alloy steel shafts ground to size. Push-button control, single or variable speed control and oil bath lubrication for gears and brakes are included.

Gear Makers Meet in Cincinnati

B. F. Waterman Chosen President—Nomenclature Decision Features Technical Standardization Program—Worm Gear Investigations Active

DISCUSSION of technical practices and liberal exchange of ideas on production and marketing problems made up in general the busy program of the fourteenth annual meeting of the American Gear Manufacturers' Association, held at the Hotel Gibson, Cincinnati, May 1-3.

Officers were elected, plants visited and entertainment, generously provided, was enjoyed.

B. F. Waterman, engineer Brown & Sharpe Mfg. Co., Providence, was chosen president to succeed A. F. Cooke, vice-president and manager of the Fawcus division of Gears & Forgings, Pittsburgh. E. W. Miller, engineer Fellows Gear Shaper Co., Springfield, Vt., was elected first vice-president and John Christiansen, president Cincinnati Gear Co., was named second vice-president. W. G. Jones, president W. A. Jones Foundry & Machine Co., Chicago, was reelected treasurer. T. W. Owen, with headquarters at 3608 Euclid Avenue, Cleveland, continues as secretary.

A. F. Cooke, Pittsburgh; F. W. England, vice-president Illinois Tool Works, Chicago; W. G. Jones, Chicago; and A. A. Ross, engineer General Electric Co., West Lynn, Mass., were elected members of the executive committee.

Henry E. Eberhardt, president Newark Gear Cutting Machine Co., Newark, N. J., was unanimously elected honorary life member of the executive committee.

The Hartford Special Machinery Co., Hartford, with R. E. Dunn as executive representative was admitted to membership in the association.

To Retain Present Gear Symbols

In having held up the work of several subcommittees, settlement of the question of symbols for gear terms may be regarded as an outstanding accomplishment of the technical standardization program of the meeting.

Nomenclature for external involute, bevel, herringbone and worm gears has been adopted by the association. The symbols used, however, have been criticized by outside interests, and at least one technical standard, that of roller transmission roller chains and sprockets, sponsored and approved by the S.A.E., the A.S.M.E., and the A.G.M.A. as a national standard, does not make use of the A.G.M.A. symbols.

Discussion of this nomenclature problem was preceded by a paper on "Symbols for Gear Terms," by A. H. Candee, Gleason Works, Rochester, N. Y. Mr. Candee advocated adoption of the technical, as distinguished from the commercial, purpose of symbols. The technical purpose comprehends use of the symbols in formulas in technical literature and in representing and recording calculations performed by an engineer or designer. In the second, or commercial purpose, the symbols are for use in correspondence, specifications and orders, and for transmitting information to the shop. The A.G.M.A. nomenclature employs multiple-letter combinations, subscripts and Greek letters being eliminated partly to facilitate typewriting and setting up in print.

Advocates Single-Letter Symbols

Mr. Candee on the other hand advocated single-letter symbols with subscripts, giving a number of definite reasons, and also employment of the Greek alphabet to represent angular values, instead of the symbol "V" used in the A.G.M.A. nomenclature. Use of Greek letters was pointed to as universal custom and it was held to be a mistake to make an exception in the single case of gearing. For those who feel that the reading and using of Greek letters should not be required in a machine shop subject like gearing, the possibility of confining gear symbols entirely to the English alphabet may be considered, said Mr. Candee.

Using single-letter symbols with subscripts, Mr. Candee outlined a method of choosing individual symbols for the various gear terms. The paper classifies the various terms in order of importance and frequency in calculations, and gives definite examples of the use of subscripts.

Appreciation of the criticism and constructive suggestions offered by Mr. Candee was voiced in the general discussion of the paper, which was presented by D. T. Hamilton, engineer Fellows Gear Shaper Co., chairman of the nomenclature committee. Some members advocated the single-letter system and use of the more common Greek letters; also simplification of the system by omitting symbols infrequently used. However, the majority seemed to prefer retaining the present system of symbols. These are to be designated as "abbreviations" and a blank column, headed "symbols," is to be included in the various nomenclatures, and filled in later according to the system adopted by the subcommittee working under the American Standards Association procedure. The nomenclature committee was instructed to prepare the four standard nomenclatures already adopted by the association as recommended practice and submit them to the sectional committee.

Herringbone Gears Discussed

Because of criticism from members of sectional committee No. 5 on helical gears, the A.G.M.A. recommended practice for herringbone gears, adopted at the meeting in Philadelphia last October, was brought up for discussion.

The criticism related to pressure and helical angles, addendum and clearance. It was suggested that the helical angle range be changed to a definite maximum and minimum, instead of from 20 to 45 deg. as at present. The list of allowable static stress values of the different gear materials came in for criticism by Prof. F. A. Mickle, University of Michigan, member of the sectional committee, who pointed out that the stress factors were too low and the factor of safety too high. He was invited to submit his proposals, with reasons, to the committee, which is headed by A. A. Ross, General Electric Co., West Lynn, Mass.

That consideration of stress loading might at some time be a minor point of emphasis and attention centered on surface conditions of the gear teeth, was a view set forth in the discussion. It was contended that it is the breaking-down load at the point of contact, the rough contact and peening action, that destroys the usefulness of gears of this type.

The aim of the committee in drafting this recommended practice was to include the standard practices of the principal makers of this type of gear, thus providing material from which to develop a single standard, at the same time permitting gear manufacturers to work within limits already successful.

Worm gear nomenclature, a suggested standard for future design, was accepted. In addition to definitions, symbols and sketches this practice includes formulas, and is in keep-

ing with nomenclature adopted for other types of gearing.

The worm gear committee, headed by W. H. Himes, engineer Westinghouse Electric & Mfg. Co., East Pittsburgh, is collecting data on capacity of worm gear sets. From tests being made at various plants it is hoped to arrive at a load formula for worm drives.

The progress of one of these investigations, being conducted by Gears & Forgings, Inc., Cleveland, at the Case School of Applied Science, was described by Emil Dukes of the Gears & Forgings company. Mr. Dukes' paper on "Load and Speed Conditions of Worm Gear Drives," is a continuation of his report at the Philadelphia meeting last October. It included a theoretical discussion of deformation and resulting stresses when a roller and a flat piece, or two rollers, are pressed together. The second part was devoted to the results of dynamometer tests on several worm and gear combinations with the object of determining load capacity.

Tables giving the horsepower ratings of steel spur pinions commonly used in industrial work were submitted by the spur gear committee, which is now headed by Prof. Earle Buckingham, Massachusetts Institute of Technology. They are based on a tooth stress of 20,000 lb. per sq. in. at 2000 ft. per min, and include minimum shaft diameter or pinion bore which would assure adequate metal above the keyway.

Appreciation of the great amount of work done in compiling these tables, which cover 30 typewritten pages, was voiced in the discussion. Certain of the values were criticized as producing pinions of abnormal proportions, and it was recommended that the committee revise the report and resubmit it at the next meeting.

The standard for transmission roller chains and sprockets sponsored by the S.A.E., A.S.M.E. and A.G.M.A. was accepted by the association as recommended practice.

Work of the keyway committee, headed by R. B. Zerfey, engineer Tool Steel Gear & Pinion Co., Cincinnati, is completed except for keyway tolerances, which are being worked out in conjunction with the inspection committee.

Change in Non-Metallic Gear Proportions Adds to Capacity

In the progress report of the non-metallic gearing committee it was brought out that "Y" factors for 20-deg. pressure angles were to be added to the A.G.M.A. recommended practice. The chairman of the committee, H. R. Moyer, Westinghouse Electric & Mfg. Co., also submitted for consideration a communication from Prof. Earle Buckingham, Massachusetts Institute of Technology, relating to tooth proportions. These data are presumably from tests on the Lewis machine and is of interest because of the increased strength obtained from the changed proportions.

Prof. Buckingham's communication read in part as follows:

"Considering the phenolic laminated materials for gears, the tensile strength is slightly less than that of cast iron, the material is far softer than any metal, while its modulus of elasticity is about one-thirtieth that of steel. In other words, if the tooth load on a steel gear which causes it to deform 0.001 in. were applied to the tooth of a similar gear made of phenolic laminated material, the tooth of the non-metallic gear would be deformed about one thirty-second inch.

B. F. WATERMAN, Engineer, Brown & Sharpe Mfg. Co., and President-Elect of the American Gear Manufacturers Association

"Under these conditions several things would happen. With all gears, regardless of the theoretical duration of contact, one tooth only will carry the load until this load is sufficient to deform the tooth the amount of the error that may be present. On well-made commercial gears of 6 DP and finer, the average normal error will be about 0.002 in. On very carefully cut gears, this error may be reduced to about one-quarter of this amount.

"On metal gears, when the tooth has been deformed the amount of the error, the stresses set up in the materials may approach or exceed the elastic limit of the material. Hence, for standard tooth forms and those generated from standard basic racks, it is dangerous to calculate their strength as very much greater than that which can be safely carried on a single tooth.

Load Supported by Several Teeth

"On gears made of phenolic laminated materials, on the other hand, the teeth will deform the amount of this normal error without setting up any appreciable stresses in the material, so that the load is actually supported by several teeth. Considering this condition alone, it would be safe to introduce a contact factor into the Lewis formula for their strength, and this contact factor would be generally larger than the theoretical duration of contact in terms of tooth intervals because the actual point of contact on successive teeth will vary from near the tip to near the root or bottom of the active tooth profiles. Also when the theoretical duration of contact is less than two teeth, actually three or more teeth may be in simultaneous contact because of the deformation.

"But this deformation also introduces another condition. Assuming a non-metallic driving pinion of conventional tooth form, when the deformation becomes appreciable, the corner of the entering tooth of the metal driven gear will make premature contact and start to cut or scrape a free path for itself into the flank of the non-metallic pinion. This condition is also present, but to a much less extent, on metal gears when the wear is excessive. The path of the corner of the driven gear as it sweeps into and out of engagement below the pitch line of the pinion is in the form of a loop known as a trochoid.

"Thus such worn tooth forms tend to have a profile of double curvature. The same condition is present when a hob or other generating tool extends so far below the base circle of an involute that undercutting takes place. As a matter of fact, the form of the fillet on any generated gear, whether undercutting takes place or not, is primarily of this same trochoidal form. Hence the additional contact of non-metallic gears is of no practical value if it must be accompanied by this undercutting because of the deformation and scraping action of the entering tooth of the metal gear. This will not only cut away part of the active profile but will also weaken the tooth, thus permitting additional deformation, additional cutting and eventually causing failure.

Design Phenolic-Laminated Gears to Favor Behavior of the Material

"For non-metallic driving pinions it is possible to minimize this condition of cutting, but only by departing from conventional tooth proportions. In other words, in order to obtain the full benefits of the peculiar physical properties of this phenolic laminated material, it is necessary to design the gear teeth themselves to favor the behavior of the material and to minimize the detrimental influence of the relatively large amount of deformation. This can be done by making the tooth of the non-metallic driving pinion all-addendum while that of the metal driven gear is made all-dedendum. In other words, the pitch circle of the non-metallic driving pinion should be at the bottom of the working depth while that of the metal driven gear at its outside diameter. In this case, the path of the entering corner of the metal driven gear in relation to the non-metallic driving pinion will be in the form of a cycloid, a form of path which will have but

little tendency to cut away the tooth of the pinion.

"Such a procedure does not require the introduction of any new form of basic rack; any of the present standard ones may be used. For many reasons, the 20 deg. stub tooth form would appear to be the logical selection. This form would give the smallest all-addendum pinion and smallest all-dedendum gear with favorable tooth shapes. It is also the strongest form of the standard ones and would thus favor the low tensile strength of this material.

Modified Non-Metallic Pinions Require Contact Factors

"To summarize, for replacement gears where standard tooth forms and proportions must be maintained, no contact factor should be used in the Lewis formula when applied to the calculation of the safe load of phenolic laminated gears. For driving pinions of this material of all-addendum form, contact factors varying from about 1.5 up to 4.0 may be safely used. In other words, by modifying the design of such driving pinions to favor the peculiar physical properties of these materials, several times the load that is safe on pinions of conventional design may be safely transmitted.

"The results of an endurance test recently completed seem to indicate that when the driven gear is of non-metallic material and of conventional design, no contact factor should be used. With heavier loads than those calculated on the basis of one tooth carrying the full load, the surface of the non-metallic driven gear above the pitch line appears to be subjected to excessive scraping. It would be desirable to make further endurance tests of such gears where the driving member is of all-addendum form. All that is needed to conduct these tests is suitable samples."

Outlines Uses of Photo-Electric Cell

The construction and uses of the photo-electric cell, described as an electrical valve that allows current to flow in proportion to the intensity of light, were outlined by L. R. Koller, General Electric Co., at the morning session, May 2.

Guarding of punch presses, testing of welding and other safety glasses for transparency; counting; sorting; smoke detecting; and color matching are among the several applications of the photo-electric relay. This device, made by the General Electric Co., was described in THE IRON AGE of May 1.

Possibilities of Tungsten-Carbide Tools Undetermined

An address by E. F. DuBrul, general manager of the National Machine Tool Builders' Association, at the closing session, was responded to by a rising vote of thanks.

The revolution in machine tool design foreshadowed by the introduction of tungsten-carbide cutting tools was one subject discussed by Mr. Du Brul. The cutting possibilities of these tools have not been fully determined, he said, because of chatter caused by vibration in the machines using the tools. Coordinated group research to develop a machine that could exploit the full possibilities of these cutting tools was advocated. For this research, in which users as well as builders of machine tools should participate, a fund of $500,000 was said not to be too large.

In discussing the need for stabilizing the demand for machine tools and other machinery, it was shown that the industry would be much more profitable if the demand for its products were more even. Irregularity in business affects us all, he said. Booms are social evils; they are followed by depressions during which it is necessary to lay off workmen. In this connection Andrew Carnegie's policy of improving plant in dull times to insure lower production costs when business picks up was cited. Many companies that withhold capital expenditures in dull times might profit by investing in new equipment.

In connection with his outline of the cost work done by his association, Mr. DuBrul emphasized the slogan "Effort spent on incorrect costs is a complete loss."

Questions Value of Easy Money As Means of Industrial Revival

Speaking at the informal banquet, held in the ballroom of the Hotel Gibson, W. P. Calhoun, professor of finance, University of Cincinnati, declared that "business conditions are now at a stage where there is a determined effort to bring out our old friend 'easy money.'

"I question the value of easy money as an agent for industrial revival," he stated. "Easy credit on low interest rates is a temptation, but is, at best, an artificial stimulus."

Professor Calhoun said that he expected better industrial conditions in the fall.

Fred. A. Geier, president of the Cincinnati Milling Machine Co., described the educational and other institutions of Cincinnati. E. S. Sawtelle, vice-president, Tool Steel Gear & Pinion Co., Cincinnati, was toastmaster. The glee club of Mr. Sawtelle's company furnished music during the banquet, which was followed by dancing.

Members of the association were luncheon guests of the Formica Insulation Co., Cincinnati, at the Hotel Gibson, May 2. Speakers included G. L. Markland, Jr., chairman of the board, Philadelphia Gear Works, and D. J. O'Connor, vice-president of the Formica company.

The luncheon was followed by a bus trip through the scenic sections of Cincinnati, stops being made at the plants of the Formica Insulation Co., and the Cincinnati Milling Machine Co.

Non-Ferrous Body Adopts Technical Research Plan

The second annual meeting and outing of the Non-Ferrous Ingot Metal Institute was held at French Lick Springs Hotel, French Lick, Ind., April 28 to 30. The principal business was a review of the work accomplished during the preceding 12 months and the approval of comprehensive plans for a program of technical research. The institute is cooperating aggressively with the American Society for Testing Materials to formulate standards for specifications for ingot brass and bronze. Reports were received and approved for financing by the institute of a research associate at the United States Bureau of Standards for the purpose of making an exhaustive investigation into the physical properties of ingot brass and bronze. With the results of this research, it is anticipated that the vast number of specifications, now being requisitioned, can be substantially reduced in number with resulting economy both to the consumer and the producer.

The officers of the institute were unanimously reelected: President, Benjamin Harris, president, Benjamin Harris & Co., Chicago; vice-president, Isadore Glueck, manager, Federated Metals Corporation, Chicago; treasurer, Lazarus Chapman, vice-president, H. Kramer & Co., Chicago. These officers, together with the following, will serve as the institute's executive committee: Joseph Axelrod, president, Girard Smelting & Refining Co., Philadelphia; William J. Coane, vice-president, Ajax Metal Co., Philadelphia; T. Lewin, Lewin Metals Corporation, East St. Louis, Ill.; and Leo Lowenstein, Nassau Smelting & Refining Works, Ltd., New York. R. D. T. Hollowell was reelected secretary-manager.

Molybdenum Output Gained 17 Per Cent in 1929

Four companies produced molybdenum ore in the United States during 1929: the Climax Molybdenum Co., at Climax, Colo., the Molybdenum Corporation of America at Sulphur Gulch, near Questa, New Mexico, the Southern Copper Mining Co. at Helvetia, Ariz., and the Minerals & Metals Corporation, near Sahuarita, Ariz., according to data collected by the United States Bureau of Mines.

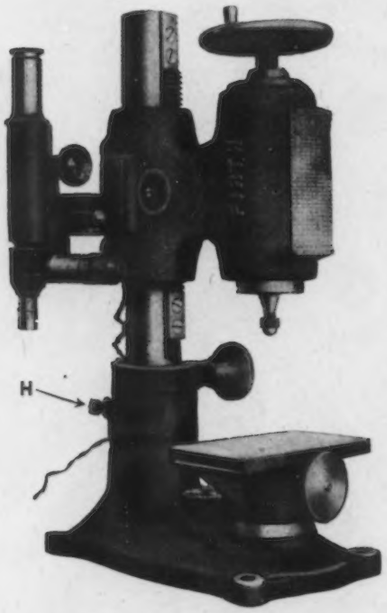
In 1929, a total of 419,400 net tons of ore was milled, yielding 3854 tons of concentrates, carrying from 75.40 to 88.33 per cent molybdenum sulphide. In addition, a small tonnage of ore carrying 16 per cent of molybdenum sulphide was produced and sold without milling. The metallic molybdenum content of the concentrates and ore so produced was 4,020,607 lb., an increase of 17 per cent over 1928. The shipments of concentrates and ore from the mines contained an equivalent of 3,904,648 lb. of elemental molybdenum.

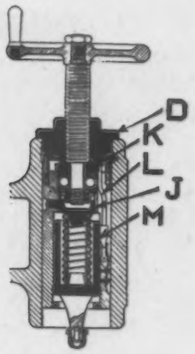
New Hardness Tester for Metals

"Hardometer" Is Applicable to Thin-Walled Materials—Microscope Attached

INCREASED use of special tool steels has led to the development of a new hardness testing machine, called the Firth Hardometer, a product of Thomas Firth & Sons, Ltd., Sheffield, England. It is being introduced into the United States by the Firth-Sterling Steel Co., McKeesport, Pa.

The principle embodied is similar to that of the Brinell machine. Because of the limitations of the hardened steel ball in the harder range of metals, a pyramidal diamond indenter may be used. The hardness numbers are obtained by dividing the load in kilograms by the area of the impression in square millimetres. Although this rule applies both with the steel ball and the diamond indenter, it has been found necessary to refer to the values so obtained as Brinell and diamond hardness number respectively. But as the values are comparative, a table is available showing the Brinell and the relative diamond hardness numbers.





THE Principle Embodied Is Similar to That of the Brinell, and a Pyramidal Diamond Indenter May Be Used. The hardness numbers are obtained by dividing the kg. load by the area of the impression. The microscopic principle of measurement is utilized while with the special diamond indenter, the hardest of hardened steel may be tested even in thin-walled tools.

The microscopic principle of measurement is utilized rather than the direct dial reading, and the principle of a spring load has been adopted to overcome the effect of inertia encountered in machines employing the deadweight or lever principle.

The Hardometer is provided with a sliding head, readily adjusted by means of a rack and pinion to take objects of different sizes. The adjustable anvil permits testing of irregular shaped articles. The load is applied through a specially calibrated spring and trip mechanism and in such a manner that only the exact load can be applied.

The machine may be supplied either with a 120-kg. load cylinder and a 1-in. microscope objective for testing medium and hard steels down to 1 mm. thick and soft metals down to 2 mm. thick, or a 30-kg. load cylinder and ½-in. microscope objective for testing medium and hard steels down to below ½ mm. thick or soft metals down to 1 mm. thick. For testing nonferrous and soft metals a 4-mm steel ball is used, for soft and fairly hard steel up to 600 Brinell, a 2-mm. ball; while with the special diamond indenter, the hardest of hardened steel may be tested even in thin-walled tools.

Overloading through compressing the spring too far is guarded against by a ratchet wheel inside the mechanism of the load cylinder. As shown in the diagram, when the spring is compressed the trigger M, upon reaching the stop L, engages the ratchet wheel K and excludes overloading of the machine. The impression of any of the three testing bodies obtained after testing is then measured diametrically by means of a microscope. From the diameter, the corresponding hardness can then be read from a table, that for the 2-mm. ball being attached to the machine itself.

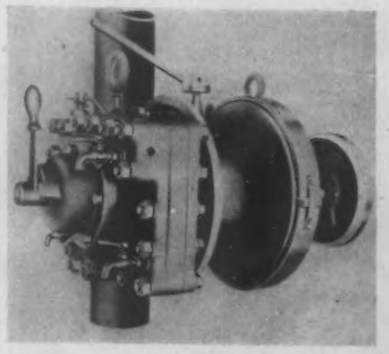
In making the impression, the pressure is applied for only about 5 sec. After the spring is slackened, the indenter is raised and the horizontally moving load cylinder is swung out until it reaches a stop. By this means the microscope mounted on an arm is brought around exactly over the impression. It may thus be measured immediately and the entire test can be effected in about 15 sec. The microscope itself, which is built up of two tubular pieces, one slidable within the other, is fitted with a micrometer scale which must be focused to suit the user's vision.

Comparative tests indicate that the values obtained with the 2-mm. ball on a Hardometer coincide practically with the Brinell results up to about 600 Brinell. The deviation at 600 Brinell is very slight. The values obtained with a diamond on the Hardometer show little deviation from the Brinell results up to about 400. Over 400 there is an increasing positive deviation as the hardness increases. This is explained by the fact that a steel ball, as used in the Brinell and other ball-impress methods, becomes gradually flattened when dealing with specimens of increasing hardness, while a diamond always retains the same shape. Consequently the hardness numbers obtained with the diamond show an increasing deviation, as the hardness of the specimen increases, from those determined from the steel ball, in the positive direction. As the Hardometer works with great regularity, an exact ratio can also be worked out from the values obtained by other testing methods.

Some of the principal advantages claimed for the Hardometer are its simplicity, its small weight, quick ascertainment of hardness numbers by means of the swinging microscope, its wide range of testing applications even to thin-walled materials, and the slight impress mark made which is an advantage in testing finished goods. On the other hand it is necessary that test pieces be carefully ground so that readings can be easily made. The application of load by means of a spring which might become fatigued after long service is a possible detriment, and the necessity of a separate light for illuminating the microscope or the test piece must be listed as a possible disadvantage.

Additions to Line of Steam or Air Hoists

TWO new models of the Leadville single-drum air or steam hoist are being placed on the market by the Gardner-Denver Co., Chicago. These have greater capacity than the earlier models, Nos. 3, 5 and 6, and will be known as No. 8 and No. 10. The line of



five hoists now ranges in capacity from 1000 to 2500 lb. rope pull.

Outstanding features of the two new hoists are improved engine design, with balanced pistons and air control through balanced spool valves, increased port areas throughout, giving greater efficiency, and the same power and speed, forward or reverse.

All moving parts are fully inclosed, the gear sets in dust-proof, oil-tight case. The brakes are of the post type, operated with a long lever for quick application and release. A non-destructive clutch, connecting and disengaging the drum from the gear set, is operated with a lever, easy in operation and positively locking in either position.

Crankshafts are of heavy forged, ground steel and run in ball bearings. All gears are made of steel, with cut teeth and heat treated. The hoists are well lubricated and all parts are ground, insuring perfect fit and operation.

Model 8 is rated at 6 hp., with a rope pull of 2000 lb. at a speed of 150 ft. a minute. The drum is 6 in. in diameter and 9¼ in. wide, and has a capacity of 620 ft. of ⅜-in. rope. The weight is 550 lb.

New All-Steel Highway Crossing

Simple Construction, Durability and Safety Feature Crossing Made of Plates and Sections

A HIGHWAY crossing made entirely of steel, which will withstand the heaviest traffic loads, has been placed on the market by Joseph T. Ryerson & Son, Inc., Chicago. Simplicity in construction is combined with the sturdiness of thick steel plates.

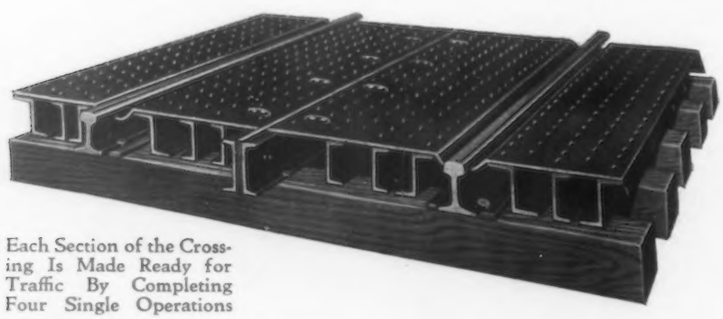
It is made of ¼-in. steel plates, firmly riveted to steel channels and zees. A feature is the ease with which it is installed. Four men will put in an 8-ft. section in less than ½ hr. Each section is ready for traffic after four simple operations.

First the outer plates are secured by placing the ends under the ball of the rail, and locking them to the rail by means of rail clips and anchor rods. The center beam is spiked firmly into the ties. The two center plates are then placed in position by slipping their flangeways under the ball of the rail. The installation is completed by fastening the center plates with a patented locking device. The crossing is thus held rigidly in place, regardless of traffic strain.

Where installation requires the two rails to be electrically insulated from each other, two rolled steel channels are bolted together with a one-inch creosoted wood strip in between. The bolts are provided with fiber bushings and washers. These bolted channels are then spiked midway between the rails in place of the center I-beam.

Both ends of the crossing are bent downward to the ground, to prevent dangling chains or air hose from catching. Ample circulation of air insures against rotting of the ties.

The all-steel crossing includes several safety features which help to prevent accidents. The plates have a tread which prevents skidding. They are level with the tracks and highway, making the entire crossing a smooth riding surface. During the winter, while an abundance of snow might be found on the highway, the crossing itself is usually clear, as snow does not tend to cling to cold steel, and is easily blown off.



Each Section of the Crossing Is Made Ready for Traffic By Completing Four Single Operations

Asbestos in Paint Form

A FIREPROOF insulating paint is being marketed by the Technical Products Co., 2308 Main Street, Pittsburgh, under the trade name of Color-Bestos.

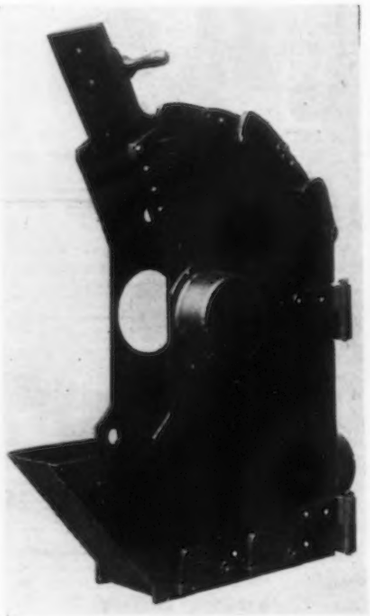
This material, which may be had in a number of colors as well as in white, can be applied either by spraying or brushing. It can be washed and scrubbed. Uses include the covering of furnaces and furnace pipes, and as it adheres readily to plaster, celotex, wall board, etc., it may be used for decorating walls. In the electrical field it is said to be useful where a colored assembling or insulating cement is required.

Wheel Guards for Snagging Grinders

A NEW line of guards designated as the style H for use with snagging type grinding machines has been placed on the market by the Ransom Mfg. Co., Oshkosh, Wis.

Steel plate is used for the body of the guard. At the top is provided an adjustable piece of ¾-in. plate which is lowered as the wheels wear down and thus serves to protect the operator in case of a broken wheel. It is supported by two ½ x 1¼-in. steel bars riveted to the side plates and is held in position by a clamping screw. All adjustments are accomplished by this piece, and therefore it is not necessary to move the guard itself at any time.

The door is hinged and is held shut by malleable iron latches instead of the usual nuts. The hinges are electric steel castings. The end of the arbor and nut are protected by a suitable cast-iron cover. The exhaust pipe opening is so positioned at the back of the guard that while the bond or dusty part of the refuse is carried off, there is no caking of this refuse in the exhaust pipe.



Snagging Grinder Wheel Guard Made of Heavy Plate. The top piece may be lowered as the grinding wheels wear down

The lower front part of the guard is removable; it may be left in place when the work is used and removed to give free access to the wheel when work is to be ground without a rest. These guards conform to the safety code of the American Standards Association and are made in eight sizes from 16 to 36 in.

Concrete Engineering Co. has moved its Chicago sales and estimating departments from 38 South Dearborn Street to 201 North Wells Street.

Regards Output High in Relation to Demand

BY LEWIS H. HANEY
Director, New York University Bureau of Business Research

THE composite demand line for steel turned down again in March. The preliminary index for the month is 100.1, the average for 1921-27 being 100. Thus it stands at about the average of recent years.

Railroad freight traffic and building contracts (floor space) declined in March. Mining activity showed a large reduction, and agricultural purchasing power declined. These developments more than counterbalanced the relatively stable levels of other factors.

Steel Production Has Been High

In comparison with the indicated current requirements of the chief consuming industries, steel production has been high. Our index for March, merely adjusted for seasonal variation, is 119. Even when reduced to terms of "standard deviation"—so as to make the variations of the two curves from their average levels more nearly comparable—the steel production curve still appears much above the composite demand line. This suggests over-production. Either the demand curve must rise or the steel curve must fall. What is the outlook?

Turning to the **railroads**, we find car loadings continuing at a low level, much lower than in any recent year. The surplus of freight cars is unusually large. Domestic orders for steam locomotives in April declined, and the same was true of freight cars. In fact, a downward trend in equipment buying is apparent in the first four months of the year and the decline was sharper than in the same period of any year back through 1922. In view of the large decline in carrier earnings, both gross and net, it is difficult to see much hope here.

In **automobile** manufacturing, the only hope for improvement in the consumption of steel appears in the low priced cars and these require much less material than others. The total production of automobiles, considering the season, has shown a merely sidewise trend through the first quarter, so that the larger proportion of light cars indicates a declining trend in steel requirements. Probably steel makers will suffer for some time from the effects of excessive automobile production last year.

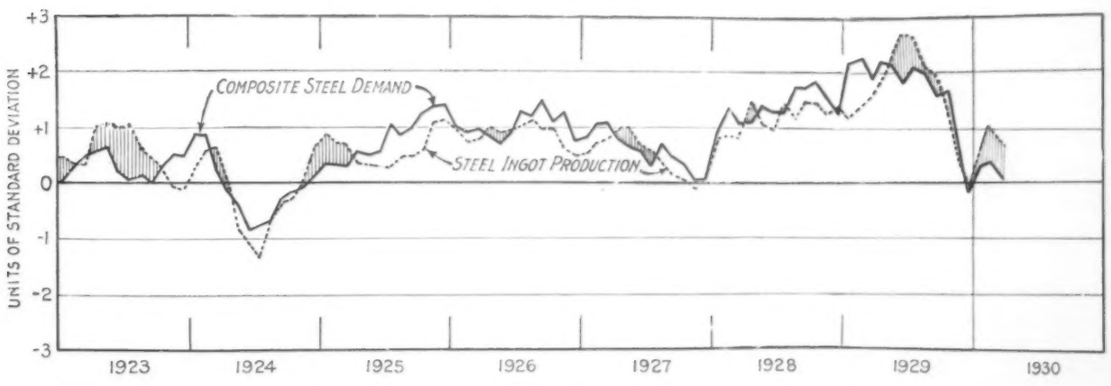
Building activity has as yet shown no upward trend. Programs for public works, utilities, and railroad construction are doubtless helping to maintain steel demand, and it is notable that structural steel orders have been supported by subway construction in New York. There is no indication, however, that such activities can carry steel requirements upward, a conclusion emphasized by the congested condition of the bond market and a continued unsatisfactory situation in mortgage bonds.

General manufacturing activities seem to be holding about level and the machine tool business is fairly well sustained. The farm situation is quite unfavorable.

Rise in Demand Not Expected

Thus it is difficult to see a rising trend in the demand line. Therefore, it is easy to see some further recession in steel production. If our measurements are correct, the indicated excess production of February and March is likely to be paid for through lower prices.

The two most serious limitations on improvement in the business situation are probably (1) the world-wide extent of depression, and unfavorable export markets, and (2) the low levels of farm income and factory payrolls, which mean the lowest consumer purchasing power since 1922. That commodity prices continue in a downward trend is not unrelated with these conditions. These are facts.



Demand for Steel in March Was at the Average of Recent Years; Production in February and March Exceeded Needs

This Issue in Brief

If factory windows are allowed to accumulate dirt, light efficiency will be cut 50 per cent. Dirt shuts out daylight and is expensive, for artificial illumination is an expense.—Page 1369.

* * *

Gets a gray iron of 40,000 lb. per sq. in. tensile strength by refining cupola metal in electric furnace. Metal is run directly from cupola into furnace. Brinell hardness is remarkably uniform, between 217 and 202. Electric furnace cuts down need for alloys. Cost of the cupola-electric furnace iron is no higher than that of cupola metal.—Page 1372.

* * *

"Snow flakes are a cause of failure of alloy steel forgings. These defects are concealed, and when the little ruptures link up, a fracture results. "Snow flakes" can be avoided by slowly cooling the finished forgings.—Page 1381.

* * *

Factory window-washing costs cut sharply. It may be done by running a tramrail along edge of roof, and suspending from it a cage equipped with a hoist. Expense is reduced as much as 75 per cent.—Page 1371.

* * *

Screw and bolt manufacturers find trend in their business is away from standardization rather than toward it. Demand for special properties and finishes is constantly growing.—Page 1377.

* * *

Cutting oil is removed from screw machine products in perforated steel cylinder 30 ft. long. While cylinder is rotating, dippers scoop steam-heated solution from adjacent tanks and dash it on the work as it passes through the cylinder.—Page 1378.

Uncertainty prevails in Detroit. Faith in forecasts has been lost. Some fear a severe summer decline. Ford and Chevrolet are getting two-thirds of the business. —Page 1390.

* * *

If you attempt to cold-shear an iron-silicon alloy, containing 4.75 per cent silicon, it will crack. But, if sheared in boiling water, it will give a good edge. Iron-silicon alloys up to 42.5 per cent silicon are ductile.—Page 1385.

* * *

Machinery export business up 9 per cent. Total for the first quarter, a new record at 170 million dollars, compared with 156 millions for 1929. Gain is largely due to active foreign demand for American agricultural implements.—Page 1439.

* * *

Gantry bridge carries arc-welding equipment to where it is needed in crane-building shop. One end of bridge is supported by a tramrail along side of building, while the other runs on a rail embedded in the floor. The bridge is traversed by a motor-driven carriage which supports the welding equipment.—Page 1382.

* * *

Investigation reveals need for revising current theories concerning the equilibrium between carbon and FeO in basic open-hearth furnace. Equilibrium constant m is not 0.01 but 0.0005.—Page 1385.

* * *

"Buying fatigue" afflicts market, says engineer. Tired and jaded now, but will revive after "reasonable period of readjustment." Medicines for sick sales statements are: Don't buck trends, conform to them; change product to cut buying resistance; economic analysis of your market. —Page 1388.

Dangerous to calculate metal gear strength as very much greater than that which can be safely carried on a single tooth, says Professor Buckingham. But in some non-metal gears load is supported by several teeth.—Page 1395.

* * *

Checks oxygen content of molten steel by adding aluminum and measuring the formation of Al_2O_3. As the aluminum reacts with iron oxide, this is an accurate means of FeO estimation, it is believed.—Page 1386.

* * *

Cuts tool steel stock from 3.8 to 1.7 months' supply by standardization. Westinghouse has set up definite specification numbers for all materials and equipment which it buys.—Page 1389.

* * *

Denies conflict of views between Department of Justice and Federal Trade Commission regarding trade practice rules. Former is not hostile to trade practice conferences, says Government attorney.—Page 1402.

* * *

To make phenolic-laminated gears last as long as possible, the pitch circle of the non-metallic driving pinion should be at the bottom of the working depth.—Page 1396.

* * *

Price manipulations by means of pools, combinations, etc., are dangerous, says economist. Recent history reveals that products so treated have suffered most severely by price declines.—Page 1388.

* * *

Thirty per cent decline in finished steel exports in first quarter of 1930 compared with same period of 1929.—Page 1437.

"Crisis Passed, Outlook Improving"

President Hoover's Views Cheer Business Leaders at Chamber of Commerce Meeting—Many Subjects Discussed

WASHINGTON, May 6.—The eighteenth annual meeting of the Chamber of Commerce of the United States, held here last week, dealing with a maze of subjects centering around the general theme "What's Ahead for Business," reflected a moderately optimistic outlook. Attended by some 3000 delegates, the conference was marked by frank discussions at the various group sessions. In the prelude to the resolutions, announcement was made that the National Business Survey Conference of the chamber, which grew out of meetings held by President Hoover last fall with industrial business, agricultural, financial and other leaders of the country, will be continued.

The chamber recommended continuance of the effort represented by the National Business Survey Conference "as a logical means through which to seek * * * information exchange between various industries and lines of business." It was held that the conference has rendered a great service to the country by mobilizing the constructive forces of business and public opinion. This, it was declared, has been accomplished by placing the facts of the situation before the public from time to time, correcting unfounded reports, and serving as a clearing house of information for the guidance of individual judgment.

President Hoover Voices Belief That Economic Crisis Has Passed

President Hoover reflected a similar view in an address at the closing meeting of the chamber last Thursday night when he expressed confidence that the economic crisis has passed and that the United States is well on its way to renewed prosperity. He announced that it is his purpose later on when the situation has become clearer to set up a commission, if the plan is generally approved, to conduct an exhaustive examination of the whole range of the nation's experiences under the boom of the past several years and the subsequent slump with a view to developing ways of greater stabilization in the future. The commission, it is understood, will form an economic council of business and other leaders of the country.

As has been observed by the iron and steel, metal-working and other industries, the President saw construction, the "balance" wheel of industry, as the weak spot in the situation, especially as it pertains to homebuilding, due partially to difficulty of mortgage money for this sort of enterprise. This was the subject of one of the important group sessions of the chamber.

One of the highlights brought out at this conference was the statement of Col. Clarence O. Sherrill, former city manager of Cincinnati, that a proper stabilization program in municipalities, impelled by the efforts of President Hoover, would undoubtedly make it possible to double the amount of construction work in any year when such work is vitally necessary and decrease it an equal amount in inflation periods when such work is not essential. Colonel Sherrill told of the success by the city of Cincinnati, the county of Hamilton, and the Bureau of Education, in attacking the problem of stabilization and employment through five-year budgeting of major projects which was done in advance of the stock market crash. The plan has been taken up in a number of cities and it was declared during the course of the conference that it is a system which promises to be generally adopted.

Pronounced Pick-up in Residential Construction Expected in Few Months

Residential building was declared by Ernest T. Trigg, president, John Lucas & Co., Inc., to represent not only the largest type of construction but also to be, in some respects, the most complex. He stated that better stabilization in this field may be promoted by the periods of vacancy survey. Basing his remarks on a recently completed nation-wide survey, Fenton B. Turck, Jr., vice-president of the American Radiator & Standard Sanitary Corporation, and chairman of the National Building Survey Conference of the National chamber, said that a pronounced pick-up in residential construction in the larger cities within the next few months, with a material improvement in the total residential figures for the year, was indicated. This was accepted as being particularly encouraging, since the larger cities have been lagging behind the small towns and suburban areas in residential construction.

Dr. John M. Gries, chief, Division of Public Construction, gave an encouraging picture of stimulated Government and private construction, including public works, public utilities, and highways, and, in pointing to the importance of these activities as an aid to industry and maintenance of employment, said construction is the major market for more than 20 products and that therefore its stimulation means more in the way of restoration of business activity than any other line.

Worst of World-wide Business Recession Is Over

In the session devoted to "What's Ahead for Business in Export," Director W. L. Cooper of the Bureau of Foreign and Domestic Commerce, speaking of the fact that business is slowly emerging from a world-wide recession, said that there is reason to believe that the worst is over and that the dark spots of depression on the international business map will tend to lighten. H. H. Rice, assistant to the president of the General Motors Corporation, advocated a complete study of the tariff on the basis of developing foreign trade. Although he is a believer in the protective tariff, Mr. Rice said it would do no good to bolster up production by increasing duties if they resulted in injury to the export trade.

Morris E. Leeds, president, Leeds & Northrup Co., Philadelphia, told the conference on industrial development that industries must realize their responsibility in developing methods of regularizing employment. He proposed that financial institutions take the lead in developing organizations to deal with the problem which, he declared, will confront industry for at least the coming decade. He suggested improvement and coordination of public and private employment agencies and also a study of preparation which students are getting for industrial activity in educational institutions.

Considerable controversy developed at the conference on "What's Ahead for Business in Inland Waterway Transportation." Cleveland A. Newton, St. Louis, general counsel of the Mississippi Valley Association, declared that the interior of the country needs cheaper transportation than that afforded by the railroads and that the remedy is improved waterways. Samuel O. Dunn, Chicago, editor of *Railway Age*, contended that, with few exceptions due to very unusual conditions, "transportation on improved rivers and canals always has been, since the early days of railroading, more expensive than by rail, is now and probably always will." Fred W. Sargent, president, Chicago & Northwestern, declared that if governmental restrictions were lifted from the railroads they would result in shippers forgetting about inland waterway transportation. John H. Small, former president of the National Rivers and Harbors Congress,

and former member of Congress, asserted that the railroads had driven the boats off the rivers. It was his opinion that there is room for all agencies of transportation to live.

Department of Justice Approves Trade Practice Conferences

The dominant note of speakers at the conference on "What's Ahead for Business in Trade Practice Conferences" was that while American business and industry has not gone far toward complete self-regulation and while there are many difficulties to be overcome, there is every reason to be hopeful and to look upon the steps so far taken as distinct advances toward a day when they will not engage in foolish and costly warfare among themselves and when their conduct will have the understanding and sympathy of government.

John Lord O'Brian, Assistant Attorney General of the United States, in an address before the joint luncheon of the American Trade Association Executives and the Washington Trade Association Executives, made it plain that the Department of Justice intends to prosecute violators of the anti-trust laws, but at the same time not to disturb those who live within the law. It was the impression that Mr. O'Brian wanted to clear up a general report that there was a conflict of views between the Department of Justice and the Federal Trade Commission regarding trade practice rules.

Regarding this matter, the Assistant to the Attorney General said that the Department of Justice has no hostility to the trade practice conferences. On the contrary, he stated, it approves these conferences and believes that within their legitimate field they afford valuable opportunity for education and for constructive progress in industry. The department, he said, is not concerned with these rules unless illegal practices result from their operations or unless, as in rare cases, he stated, the rules on their face obviously contemplate action which if taken would be unlawful.

He said that the courts have long since recognized the legitimate functions of trade associations and have fully appreciated their powerful influences in American trade and industry. Law officers of the Department of Justice, he declared, have no interest and no point of view adverse to the proper activities of trade associations. They have no concern, it was stated, with the affairs of those associations except as individual members who, through the use of these associations or their rules, may adopt practices which lead to violation of the anti-trust laws.

Department Has Found "Convincing Evidence" of Price Fixing

"Perhaps it is only reasonable to expect that certain excesses of zeal are bound to occur in the experimentation with business practices which are a feature of the evolution of the trade association," said Mr. O'Brian. "Candor, however, compels the statement that here and there illegal practices do come to light. Fortunately they are not characteristic of the work of the great body of trade associations. Some of these practices are unlawful because discriminatory or because they aim at monopolization of channels of distribution, or for other reasons. But the complaint most often made is that of price fixing and in certain quarters convincing evidence of this practice has been found by the Department of Justice."

It was asserted that no one can be engaged in this practice without knowing it and that no one needs a lawyer to tell him whether he is in fact fixing prices by means of understandings or agreements with competitors. On this as on similar questions the Federal Trade Commission and the Department of Justice are, so far as he knows, entirely in harmony, Mr. O'Brian said. Neither one, it was pointed out, has ever sanctioned or intended to sanction this practice. There have, nevertheless, been recent instances, Mr. O'Brian told the gathering, where the practice of price fixing has been attempted by the misuse of the so-called code of ethics or trade rules. Where these illegal practices exist, it was explained, the Attorney General intends to check them by appropriate legal action. This was said to be necessary in fairness to the other trade associations and in justice to other business interests as well as to the public generally.

"But in all this there is no cause for anxiety or uncertainty in the business world," said Mr. O'Brian. "There are no revolutionary law policies impending. The number who take chances are relatively few, and those who take chances should not complain of the consequences."

William Butterworth, chairman, Deere & Co., Moline, Ill., was reelected president and Julius H. Barnes, president, Barnes-Ames Co., New York, was reelected chairman of the board; Henry D. Sharpe, president, Brown & Sharpe Mfg. Co., Providence, R. I., was elected as director for the foreign commerce group and Carl A. Johnson, president, Gisholt Machine Co., Madison, Wis., was elected director for the manufacture group.

Labor Turnover Half of Last Year's

Under 2 Per Cent in March—More Accessions Than Separations in Metal-Working Industries

TURNOVER of labor is reported by the United States Bureau of Labor Statistics to have been 1.95 per cent, in March, of employees on the payroll. This compares with 4.17 per cent in March, 1929, and there has not been a lower figure in the interim except that of December, at 1.24. The net turnover rate is the lower of two rates worked out each month, one being that for separations and the other that for accessions.

Separation rates cover the matters of quitting the job, lay-offs and discharges. For March, these figures were respectively 1.38, 1.03 and 0.30 per cent, making a total separation rate of 2.71 per cent. The accession rate in March was 1.95 per cent. As this was lower than the separation rate, it became the net turnover rate.

More Men Quit Than Were Discharged

It is noteworthy that more than half of the separations occurred because the men quit of their own volition. Something more than one-third of the number came about because of lay-offs, due to inadequate business to keep the whole force employed. The discharge rate was about one in every nine of the separations. The separation rate as a whole was the highest since last November, but was less than two-thirds that of March, 1929, when 4.17 was registered.

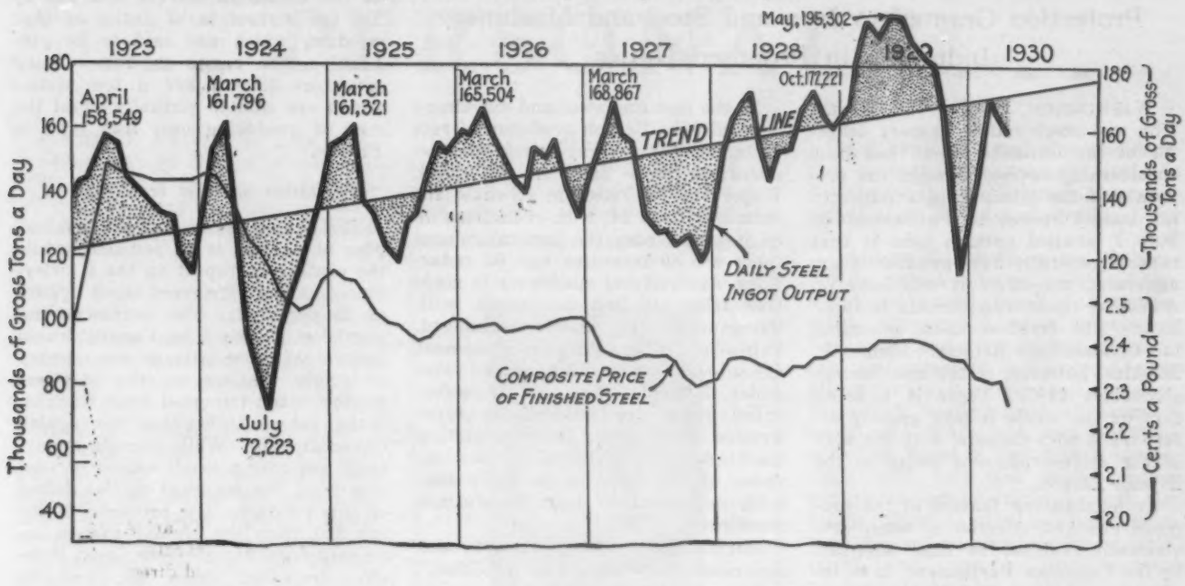
These indexes are made up from reports received from representative plants in 75 different manufacturing lines. That for iron and steel differs markedly from the averages quoted above.

Here the quits, at 1.35, were about in the same ratio as the quits in the general average. But the lay-offs, at 0.45, were at less than half the rate of the general average and the discharges, 0.20, were much lower than in the average case. The sum of these three figures made a monthly total of 2.00 as the separation rate.

The accession rate in this industry was 2.54, which is considerably higher than that for the average industry. In this instance the net turnover rate is taken from the separation rate, rather than the accession rate, because the separation rate was the lower of the two. Hence, the turnover rate in the iron and steel industry in March was 2 per cent, which is substantially the same as in February, and is considerably less than the 3.23 per cent in January.

Similarly, the net turnover rate in the foundry and machine shop group in March was 2.33 per cent, compared with 1.62 per cent in February. In automobiles it was 3.93 per cent, compared with 3.11 per cent in February and 4.08 per cent in January. In both foundries and machine shops and the automotive group the separation rates were lower than the accession rates, indicating that these industries, as well as the iron and steel industry, were picking up in employment during the period.

Ingot Output in April Was at a Lower Rate, Dropping the Curve Further Below the Long-Time Trend Line. Prices in April made the sharpest drop of recent years



Further Loss in Rate of Ingot Output

April Daily Production 3.4 Per Cent Under March—Month's Total Third Highest for Any April—Four Months 13.4 Per Cent Below 1929

PRODUCTION of steel ingots in the United States in April is calculated by the American Iron and Steel Institute at 4,143,312 gross tons. This is a loss of 3.4 per cent from the 4,288,985 tons of March, but it is the largest total for any April except in 1929 and 1928. The figures are based upon returns of companies which made 94.51 per cent of the total 1928 output. The remaining 5.49 per cent is assumed to have maintained the same proportion as in that year.

On the daily basis the April output, at 159,358 tons in each of 26 working days, showed a reduction of 3.4 per cent from the 164,961 tons of March. With the further exception of February, however, it was the largest since last October.

For the first four months of the year production was 16,286,718 tons. This shows a recession of nearly 13½ per cent from the 18,812,637 tons made in the first four months of 1929, the high record. With the further exceptions of 1928 and 1926, however, the output in the first four months of 1930 was the largest ever recorded for any like period.

In total tonnage there were losses in both the open-hearth and Bessemer classifications. Open - hearth steel showed a drop of 3 per cent from March and Bessemer steel a decline of nearly 6 per cent. The figures in the table represent open-hearth and Bessemer steel only, as monthly figures for electric and crucible ingots are no longer collected. In 1928 electric and crucible ingots averaged about 1480 tons a day.

Curves of ingot production and of finished steel prices are carried in the diagram from the beginning of 1923. The table gives the monthly output of open-hearth and Bessemer steel ingots, as reported by the institute, for the past 16 months.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(GROSS TONS)

Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Output of All Companies		No. of Working Days
	Open-Hearth	Bessemer	Monthly	Daily	
Total, 1928	40,538,657	6,591,217	49,865,185	160,338	311
1929					
January	3,694,218	549,616	4,490,354	166,309	27
February	3,599,224	489,279	4,326,000	180,250	24
March	4,183,869	596,691	5,058,258	194,548	26
April	4,026,576	640,351	4,938,025	189,924	26
4 months	15,503,887	2,275,937	18,812,637	182,647	103
May	4,276,186	707,484	5,273,167	195,302	27
June	3,990,798	622,585	4,881,370	195,255	25
July	3,922,532	649,950	4,838,093	186,080	26
August	3,988,729	668,023	4,927,258	182,491	27
September	3,627,639	635,593	4,510,879	180,435	25
October	3,619,432	644,528	4,511,650	167,098	27
November	2,797,488	522,672	3,513,025	135,116	26
December	2,376,775	360,489	2,896,269	115,851	25
Total, 1929	44,103,466	7,087,261	54,164,348	174,162	311
1930					
January	3,137,002	441,572	3,786,450	140,239	27
February	3,336,021	508,618	4,067,971	169,499	24
March	3,513,904	539,616	4,288,985	164,961	26
April	3,406,610	509,234	4,143,312	159,358	26
4 months	13,393,537	1,999,040	16,286,718	158,123	103

Chain Belt Co., Milwaukee, has appointed A. F. McKee, Ingeniero, as its representative in Mexico for its entire line of mixers, belt conveyors and other products. Mr. McKee's address is Edificio Cook, San Juan De Lethran, 24, Mexico, D. F.

Allis-Chalmers Mfg. Co. has moved its Chicago office to the Civic Opera Building, 20 North Wacker Drive.

Canada Raises a New Tariff Wall

Protection Granted to Iron and Steel and Machinery Industries in Proposed Duties

WASHINGTON, May 6.—While the iron and steel and machinery schedule of the Canadian tariff has been considerably revised through the proposals of the Minister of Finance in his budget speech to Parliament on May 1, studied opinion here is that reports generally have apparently exaggerated the effect it will have on American trade with Canada in those lines. The tariff revision, according to Commercial Attache Lynn W. Meekins, however, is the most extensive since 1907. There is a belief that on the whole it may greatly affect trade with Canada, with the bulk of the shifted business going to the British Empire.

An outstanding feature of the proposed changes, effective at once, provisionally, subject to final adoption by the Canadian Parliament, is to increase preferences to British products. The Canadian Prime Minister has declared that the revision is not of a retaliatory character in return for the pending Hawley-Smoot bill. There is a feeling, however, that it is partially intended in that direction, though the fact that it will affect all countries has a tendency to offset this attitude.

The proposed revision changes 495 items. The British preferential rate is decreased on 270 items, including 216 made duty free, with an increase on 11 items. Under the intermediate tariff, which applies to imports from countries having favored-nation treaties with Canada, the rates are decreased on 98 items, with increased rates on 35. Under the general tariff, which applies to imports from the United States and other countries having no commercial treaties with Canada, the rates are increased on 87 items, with decreases on 82. British and Empire trade is favored to a great extent by the increased spread between the preferential and general rates.

Features of the New Tariff

New features of the proposals include a countervailing duty on cast iron pipe, the making of scrap iron and steel imports free from all countries, placing a surtax of 5 per cent on ferroalloys, leaving the tariff rate on tin plate unchanged, but providing for duties of 7½ per cent under the British preferential, 12½ per cent under the intermediate, and 15 per cent under the general group, if Canada begins to make tin plate, and leaving skelp free under the British preferential, and dutiable at 5 per cent under the intermediate and general, but to be made dutiable at 5 per cent under the British preferential, 10 per cent intermediate, and 12½ per cent general, if Canada begins to produce this material. The rates on pig iron are unchanged.

In the iron and steel and machinery schedule, the British preferential rate is increased on eight items, and reduced, or made free, on 152 items. Under the intermediate schedule the increases total 24, with reductions on 86 items. Under the general column there are 40 increases and 66 reductions. Agricultural machinery is made free from all British sources, with the general rates mostly unchanged. Printing machinery and equipment are subject to materially reduced rates under all tariffs. The British preferential rates are reduced on typewriters, dictaphones and calculating machines. There is a downward revision of the rates on certain household, miscellaneous and construction machinery.

Machinery, engines, boilers and electrical, "not elsewhere specified," and parts thereof, if of a class or kind not made in Canada, are free under the British preferential, 15 per cent under the intermediate, and 20 per cent under the general tariff. If of a class made in Canada, the British preferential rate is 15 per cent, the intermediate 25 per cent, and the general 30 per cent.

Bounty on Coking Coal

Provision is also made for granting a bounty of 49½c. a net ton on bituminous coal mined and converted into coke in Canada, when used in smelting iron ore or producing steel. This bounty, it has been observed, is the exact equivalent of the 99 per cent drawback allowed on bituminous coal imported into Canada for making metallurgical coke. Virtually all of this coal comes from the United States and the vast bulk of it goes to Ontario. The apparent effect of this bounty will be to benefit the iron and steel industry in Nova Scotia, which provides most of its own coking coal and give to it the same allowance that is given the Ontario iron and steel industry.

The countervailing duty applying to cast iron pipe apparently will have a much greater effect on imports of cast iron pipe from France than on those from the United States. France is the chief supplier of cast iron pipe to the Canadian market and has by far the highest tariff duties on that product, which are said to be prohibitive, the range in duties being given as $20 to $27 a ton, duties which are said to virtually equal the cost of producing cast iron pipe in France.

Duties on Cast Iron Pipe

The United States duty on cast iron pipe at present is 20 per cent, while the conference report on the Hawley-Smoot tariff bill agreed upon a duty of 25 per cent. The countervailing provision proposed by Canada would impose the same rate as the country of origin imposes on the identical product when imported from Canada, if that rate is higher than the regular Canadian rate. While Canada apparently has only a small output of cast iron pipe, the proposal carries duties on this product. The proposed duties are $10 from the United States, increased from $8; $5 from Great Britain, decreased from $6, and $9 intermediate (which would include France), increased from $7. But under the countervailing provision, apparently imports from France would be equal to duties that country assesses and thereby shut out French cast iron pipe. The duty of $10 against American cast iron pipe, on the other hand, it is believed, would not be much, if any, higher than the proposed American duty of 25 per cent, which would apply on theoretical imports from Canada. But the decrease in the duty on British pipe evidently will adversely affect imports from the United States, while increasing those from British countries. Figures on imports of cast iron pipe into Canada during 1924-1927 show that in each year France was the principal source of supply.

Under the revised rates, skelp imports under British preferential will be free as against the old range which made some of these imports free and others, depending on size, dutiable at 5 per cent. Both the intermediate and general rates become 5 per cent under the revision, while these rates ranged from 5 to 12½ per cent without distinction as to groups. Tin plate was free under the old tariff and dutiable at 5 per cent in the intermediate and general groups.

By-Product and Beehive Coke Produced (a)

(Net Tons)

	March, 1930	February, 1930	March, 1929
By-product coke	4,393,696	4,004,217	4,613,075
do., three months	12,593,587	.....	13,062,979
do., stocks, end of month	1,992,773	1,843,354	1,212,562
do., per cent made in furnace plants	76.8	76.4	78.4
Beehive coke	290,700	281,000	533,500
do., three months	891,900	.....	1,452,800
do., per cent of total coke	6.2	6.6	10.4
Total coke	4,684,396	4,285,217	5,146,575
do., three months	13,485,487	.....	14,515,779
do., net tons made to each 1000 gross tons of pig iron	1,443	1,509	1,386

(a) United States Bureau of Mines.

▲▲▲ PERSONALS ▲▲▲

ARNOLD O. BRAUN has been made vice-president in charge of sales of P. R. Mallory & Co., Inc., Indianapolis, manufacturer of Elkonite dies, electrical contacts and other industrial products.

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RAY J. ALTON, who has been in charge of the Detroit warehouse of the Watson Brothers Steel Co., Youngstown, has been elected vice-president of the company.

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ALAN M. SCAIFE, for the past 10 years with William B. Scaife & Sons Co., Oakmont, Pa., has been elected president, succeeding his father, the late James Verner Scaife. JAMES VERNER SCAIFE, JR., has been made vice-president to fill the vacancy caused by the election of his brother to the presidency.

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ALBERT SHAW has been added to the staff of the Salt Lake City, Utah, office of the Wagner Electric Co., St. Louis.

—

J. C. DAVIS, purchasing agent of the Reliance Electric & Engineering Co., Cleveland, has been elected president of the Purchasing Agents' Association of Cleveland.

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RAYMOND SEABROOK, formerly secretary of the Nason Mfg. Co., New York, has been elected president to succeed his father, the late H. H. Seabrook. He is the fourth of his family to head this 90-year-old concern founded by his grandfather, and he has been with the company for 19 years.

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E. A. CLARK, sales engineer of the Philadelphia office of the Reliance Electric & Engineering Co., has been advanced to the engineering department in Cleveland, where he will be engaged in the design of direct-current motors.

—

HUBERT F. HANKS has been appointed assistant general manager of sales, and C. E. KENDALL, manager of the fence department of the Pittsburgh Steel Co., Pittsburgh. Mr. Hanks has been connected with the Pittsburgh Steel Co. since 1909. He represented the company as traveling salesman in different sections of the country until 1920, when he went to the Pittsburgh office as manager of the fence department. Mr. Kendall joined the Chicago office of the Pittsburgh Steel Co. in 1919 and became assistant manager of that office in 1923. In December, 1928, he went to Pittsburgh as assistant manager of the fence department, in which capacity he has served until the present time.

R. W. GILLISPIE, heretofore vice-president and general manager of the Jeffrey Mfg. Co., Columbus, Ohio, has been elected president, succeeding

R. W. Gillispie

ROBERT H. JEFFREY, who has been made chairman of the board. In addition to being president of the Jeffrey company, Mr. Gillispie is also president of two subsidiary companies, the Jeffrey Mfg. Co., Ltd., Montreal, and the Galion Iron Works & Mfg. Co., Galion, Ohio.

—

SHIRLEY S. FRENCH has resigned, effective May 1, as president of the Berger Mfg. Co., Canton, Ohio, now a subsidiary of the Republic Steel Corporation. For the past 18 months he has been vice-president and treasurer of the Central Alloy Steel Corporation. He had been at the head of the Berger company three years, and previously was for 10 years vice-president and general manager of the Fireproofing Co., Youngstown, Ohio. JOSEPH B. MONTGOMERY will continue as vice-president and general manager of the Berger company and J. S. SPROTT remains as general sales manager, GEORGE B. HARLAN as secretary-treasurer, and FRED A. SCHMITZ as factory manager. The Berger company for 44 years has manufactured fabricated steel products, including steel office furniture, shelving, lockers, steel ceilings, metal lath, and other building products.

—

JOHN TOD resigned May 6 as a director of the Youngstown Sheet & Tube Co. He will also relinquish his duties as a member of the advisory committee. He intends to go abroad for an indefinite stay. He will be succeeded on the board by WALTER E. MEUB, secretary-treasurer of the company.

CHARLES R. KNAPP, vice-president and contracting manager, Heyl & Patterson, Inc., Pittsburgh, has resigned after 30 years of service.

—

CHARLES M. WHITE, whose resignation as general superintendent of the Aliquippa works, Jones & Laughlin Steel Corporation, was announced last week, has been appointed assistant vice-president in charge of operations for the Republic Steel Corporation, with headquarters at Youngstown. Mr. White had been identified with the Jones & Laughlin company since 1913, and was made general superintendent at Aliquippa last October. Previously he had been assistant general superintendent of that plant, and prior to that superintendent of the company's South Side works, Pittsburgh.

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JOSEPH R. MILLER has joined the organization of Arthur G. McKee & Co., Cleveland, metallurgical engineer, in connection with metallurgical features concerned with the design of the Magnitogorsk (Magnet Mountain) steel plant in the Ural region of Russia, for which plant the McKee organization has been retained as consulting and designing engineer.

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WILLIAM T. KYLE, sales manager of the Page Steel & Wire Co., formerly the Okonite Co., Bridgeport, Conn., has resigned to accept the presidency of the Welding Engineering & Research Corporation, New York.

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C. E. MOBERG, factory superintendent at the One Minute Mfg. Co., Newton, Iowa, for the past six years, has gone to Dowagiac, Mich., to become works manager for the Beckwith Stove Co.

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E. W. BECKMAN, foundry superintendent for the Kewanee Boiler Corporation, Kewanee, Ill., has resigned to become assistant general superintendent of the Walworth Co.'s plant in that city.

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E. C. FRY, formerly general manager, Harrisburg Pipe & Pipe Bending Co., and F. D. ANDREWS, formerly general superintendent of the same company, have opened an office at 620 Lewis Tower Building, Philadelphia, and will handle steel products under the trading name of Andrews-Fry Sales Co.

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B. F. SHEPHERD, head of the metallurgical department, Ingersoll-Rand Co., Phillipsburg, N. J., has gone to Europe and will inspect various steelmaking plants in Sweden, Germany, Italy and France before he returns.

W. J. WARNER, who has been superintendent of the cylinder finish department, Harrisburg Pipe & Pipe Bending Co., has also been given charge of the coupling department.

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F. L. GIBBONS, who has been Cleveland district sales manager of the Central Alloy Steel Corporation, has been appointed assistant sales manager for the Cleveland district of the Republic Steel Corporation and will serve under W. E. COLLIER, who remains as Republic district manager in that city. The Central and Republic offices will be merged late in the month in new quarters in the Union Trust Building.

▲ ▲ ▲ OBITUARY ▲ ▲ ▲

DR. ALLERTON SEWARD CUSHMAN, founder of the Institute of Industrial Research in Washington and its director from 1910 to 1924, died May 1 at the Park East Hospital, New York, after an operation. He was born on June 2, 1867, in the American Consulate in Rome, while his father, the late Edwin Cushman, was consul. After graduating from the Worcester Polytechnic Institute in 1888, he studied for two years in Europe at Freiberg and Heidelberg, returning to the United States to acquire advanced degrees at Harvard University. In the war with Spain he enlisted as a private in the Sixth Massachusetts Volunteer Infantry and advanced to the rank of captain. He began his professional career as an associate professor of chemistry in Bryn Mawr College. Two years later, in 1902, he became assistant director in the Office of Public Roads in the Department of Agriculture, and it was during this connection that he expounded his classic studies on the theory of metallic corrosion. In 1910, he established the Institute of Industrial Research. For the last six years Dr. Cushman had lived in New York, in consulting practice, and among other connections, he was consulting metallurgical engineer to the American Rolling Mill Co. During the World War Dr. Cushman was stationed at the Frankford Arsenal in Pennsylvania, holding the rank of lieutenant-colonel of ordnance.

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W. H. FREET, assistant sales manager of the Chambersburg Engineering Co., Chambersburg, Pa., died on April 26, aged 49 years. He joined the company in 1900 as secretary to the president and 10 years later was made purchasing agent, which position he filled until 1928, when he was appointed assistant sales manager.

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GEORGE B. SHEPARD, president, Eberhard Mfg. Co., Cleveland, maker of vehicle and saddlery hardware and malleable iron products, died May 2 after an operation. He had been ill about two months. He became connected with the company in 1883, following his graduation from Harvard University. He served as assistant treasurer, treasurer, and vice-president, and in 1925 was elected president. He was 65 years old.

WILLIAM C. REITZ, vice-president and treasurer and one of the founders of the Pittsburgh Steel Co., Pittsburgh, died at his home in that city on May 3, following a short illness. He was born at Pittsburgh in 1855 and attended school in that city. After a varied career in the Pittsburgh steel industry, he joined with others in the organization of the Pittsburgh company in 1900, and had served it continuously as vice-president and treasurer and a director. He was also treasurer of the Pittsburgh Steel Products Co., the National Steel Fabric Co., the Monessen Coal & Coke Co., and the Pittsburgh Steel Ore Co., all subsidiaries of the company with which he was identified.

William C. Reitz

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CARL MARQUARDT, founder of the Milwaukee Woven Wire Works and for 20 years its president, died, May 1, at the age of 93 years. He was born in Germany and came to the United States in 1866, locating immediately in Milwaukee. Mr. Marquardt retired about two years ago, passing the presidency and general management of the business, now known as the Marquardt Co., to his son, Reinhold W. Marquardt.

—

C. E. MCDANIEL, president, Ottumwa Boiler Works, Ottumwa, Iowa, which he had founded 40 years ago, and prominent in industrial and civic circles of the city, died on April 22 in his home after several weeks' illness. He was 73 years old.

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WILLIAM ROBERTSON, president, William Robertson & Co., Chicago, manufacturer of railroad terminal equipment, died April 28, after a brief illness.

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JAMES H. BOUCHER, a member of the firm of Mathews & Boucher, wholesale hardware, Rochester, N. Y., died at his home in that city on May 1, aged 78 years.

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HENRY L. DIXON, president of the H. L. Dixon Co., Pittsburgh, died at his home in Dormont, Pa., on May 3, aged 70 years. He was born in Lawrenceville, Pa., and early in life became associated with his father in the manufacture of glass factory supplies under the name of the Dixon-Woods Co. He left that firm in 1902 to form his own company, of which he was president until his death. Mr. Dixon was also treasurer of the Thromal Engineering Co., Pittsburgh.

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LOUIS BROWN, formerly president and later chairman of the board of the Oil Well Supply Co., Pittsburgh, died at his home in that city on May 2, aged 68 years. He was born in New York and began his business career in that city with John E. White & Co., iron merchants, in 1879. He later served as German representative for this concern. In 1889 he was made assistant manager in the Pittsburgh office of the National Tube Co., but left this position two years later to become assistant treasurer of the Oil Well Supply Co. He served as treasurer of this company from 1895 until 1911 when he became president. Mr. Brown had retired as chairman of the company in January, 1929.

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WILLIAM LATHAM ABBOTT, a former partner of Andrew Carnegie, died in New York on May 2, aged 77 years. He was prominently identified with the Pittsburgh steel industry some 40 years ago, having served as president of Carnegie, Phipps & Co., Ltd., and as chairman of the board of the Carnegie Steel Co. Mr. Abbott had been retired from business for more than 30 years.

Singer Kennedy Corporation, builder of radial, common and face brick chimneys, also firebrick furnaces and high-temperature firebrick work, has moved its offices from 39 West Adams Street to 203 South Dearborn Street, Chicago.

The Wallace G. Imhoff Co., consultant in zinc coating, has moved its headquarters from the Highland Building, Pittsburgh, to Vineland, N. J.

President Proposes an Economic Council

WASHINGTON, May 3.—The proposal of President Hoover to organize an economic council to assure greater business stability in the future has created widespread interest. Announcement of his plan was made in his address before the Chamber of Commerce of the United States last week, but it is believed here that it will be some time before the organization is set up. It will be a body representative of business, economics, agriculture and labor, but the assumption is that since the Chamber of Commerce has voted to continue for another year its National Business Survey Conference, the proposed council will not be created until after the chamber's conference has come to an end. Or, it has been pointed out, some form of reorganization may be determined upon to transform the conference into the suggested council, apparently with a view to making it a continuing body.

It is recalled that the President, when he called the business conference through the national chamber on Dec. 5, 1929, pointed out that the business interests had been invited "to create a temporary organization for the purpose of systematically spreading into industry as a whole the measures which have been taken by some of our leading industries to counteract the effect of the recent panic in the stock market."

The address of the President at the annual convention of the National Chamber would indicate that he now feels that there is a demand for setting up an economic council which would be like that which grew out of the unemployment conference of 1921 and which made an exhaustive study of the business cycle. The work of the National Business Survey Conference apparently has impressed the President as providing background for a continued study by the proposed commission.

After declaring that advancement has been made during the past six months in the methods of stability, and development of the credit system, statistics and security and relief in depression, the President added:

> But the whole range of our experiences from this boom and slump should be placed under accurate examination with a view to broad determination of what can be done to achieve greater stability for the future both in prevention and in remedy. If such an exhaustive examination meets with general approval, I shall, when the situation clears a little, move to organize a body—representative of business, economics, labor and agriculture—to undertake it.

Spiegeleisen Imports to April 1

Imports of spiegeleisen into the United States for the first quarter of this year were 3004 tons, having a valuation of $88,167. All of this came from Great Britain. The shipments for the first quarter, of practically 1000 tons per month, compare with a total in 1929 of 13,828 tons, or 1150 tons per month, valued at $403,853. Of the 1929 imports, 13,103 tons came from Britain and 725 tons from Germany.

Engineering Council to Meet May 12

Appointments to the administrative board for 1930, and arrangements for a meeting of the board in Washington May 12 and 13, have been announced by the American Engineering Council.

Members of the new administrative board include C. E. Grunsky, president of the council, and the following vice-presidents: L. P. Alford and L. B. Stillwell, New York; O. H. Koch, Dallas, Tex.; G. S. Williams, Ann Arbor, Mich.

The following representatives of the constituent organizations of the council were also appointed to the board:

American Institute of Chemical Engineers.—Dr. H. E. Howe, Washington.

American Institute of Consulting Engineers.—Edwin F. Wendt, Washington.

American Institute of Electrical Engineers.—C. O. Bickelhaupt, Atlanta, Ga.; H. A. Kidder, New York; R. F. Schuchardt, Chicago; Prof. C. F. Scott, Yale University; C. E. Skinner, East Pittsburgh.

American Society of Agricultural Engineers.—Prof. William Boss, University of Minnesota.

American Society of Civil Engineers.—H. S. Crocker, Denver; A. J. Dyer, Nashville; Dean Anson Marston, Iowa State College; Frank M. Williams, Albany, N. Y.

American Society of Mechanical Engineers.—John Lyle Harrington, Kansas City, Mo.; John H. Lawrence, New York; Gen. R. C. Marshall, Jr., Chicago; Charles Piez, Chicago; E. N. Trump, Syracuse, N. Y., and D. Robert Yarnall, Philadelphia.

A 240-Ton Anvil Base of Two Steel Castings

WEIGHING 240 tons, this hammer base, made by the Wheeling Mold & Foundry Co., Wheeling, W. Va., is for a 25,000-lb. drop hammer. It was built up of two castings, one of 115 tons and the other 125 tons. Cast of low-carbon, acid open-hearth steel, each one took the output of three furnaces. The completed unit is 13 ft. 4 in. high, 14 ft. long at the top and 8 ft. 6 in. across at the base.

The joint between the castings was so perfect that practically no fitting or chipping was necessary. The large lifting trunnions were provided to facilitate handling. The unit was made for the Erie Foundry Co., Erie, Pa., which is building the complete hammer for the Henry Vogt Machine Co., Louisville, Ky.

It is claimed that the Wheeling foundry has not yet reached its limit in size, provided the finished units can be shipped and installed. In installing this casting, it was necessary to arrange with the railroad to have a wrecking crane handle it at destination

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

ESTABLISHED 1855

Steel and General Trade

PERHAPS at no time in the whole history of the steel trade has the rate of steel production been watched with the closeness and the interest that has been manifested in the last few months. Producers and consumers have watched it to secure a line on the future, and outsiders have watched it to secure a line on general trade.

Now that so much time has passed since the stock market collapse which began in the last week of October, it is well to take a retrospect, to arrange our views in more orderly manner, and correct such appraisals as events may have proved were erroneous. The first notion was that the collapse was an event by itself, something which might have occurred months before if people had been so minded, but that the influence would be far reaching in business and cover a long period of time.

The record month by month of steel production now shows clearly that a definite and important recession had begun at approximately the middle of last year and was in full progress at the time of the stock market's collapse. Steel ingot production in October was 14½ per cent under the peak of earlier in the year, which was abnormal, for 1925, 1926 and 1928 showed an average of only 5½ per cent decrease. We ignore 1927, as it was an abnormal year, having a very poor second half.

After October, production dropped sharply, which was due to the psychological influence of the stock market, everyone being at sea. Looking backward, we may now explain the remarkable bulge in steel production in late January and early February as being an equalization for the extreme dip preceding. Buyers curtailed too much. By the same token, the decrease that followed, in late February and in March, which aroused so much concern, was merely a return to the general normal, there having been simply a special dip and a special bulge.

The direct influence of the stock market collapse wore off, it would seem, by some time in January, and steel is now in line with the long swing in general trade, which the records have been showing has not been altogether so poor as was being guessed before specific data became available.

A fear entertained by some observers earlier in the year, that steel was then running partly on momentum carried over from before the stock market collapse, is now dispelled. Plainly steel is running entirely on its power. There does not seem to be much steam stored in the boilers, by way of backlog orders on mill books, but there is adequate pressure in that orders are being placed and quick shipment demanded, and there is fuel for the boilers in that visible consuming requirements are large. One could not expect the usual seasonal decline in steel for the summer to be avoided entirely but it may be less marked than in some years which as entities were good years.

Shortening Earning Time

WITH business in somewhat depressed condition and unemployment rather impressive there is still more talk about the advisability of shortening the working time. Thereby it is thought more men would be employed and at the same time perhaps production would be restricted and thus profits might be sustained.

There is a good bit of loose thinking and loose talking along these lines. The prospect has particularly allured the American Federation of Labor and some members of the Government at Washington. No one directly involved in business activities is likely to take a broad view. Naturally he will think of his own case.

Building trade artisans want the week as short as possible, as they feel they can get just as much weekly earnings. But if the total situation be considered, it is obvious that as building costs are lowered old houses will not be allowed to stand so long. New ones for economic reasons and modernness will displace the old. Thus the sum total of building operations will be increased, to the manifest benefit of those who supply materials, if not to the financial benefit of the building trades artisans individually.

Producing goods is in a different category. There is a financial investment which demands an annual return, and the shorter the working time the harder it is to make that return. Contrast the coal mine, which at its best operates six eight-hour turns a week, with the steel mill which operates three times as well and the blast furnace which operates three and one-half times as well. The earnings burden on the unit of output is correspondingly reduced.

If we could start all over again we could arrange matters very differently. Factories, mines, etc., could run 16 eight-hour turns a week, being off, say, from 4 p. m. Saturday to 8 a. m. Monday. The investment would be earning during 128 hours a week against 44 hours with five and a half eight-hour days, or 2.9 times as much. The hours of employment furnished to labor would be about the same. But, with so much less capital charge against output, the selling price of the

product could be so reduced as to encourage much greater demand and thus call for many more workers.

The big difficulty is that we cannot start all over again. The factories are already in existence, and somewhat too many of them as it is. Hence almost tripling the efficiency of one factory would throw two others out entirely. As the owners would not stand for this, we are faced with the awkward proposal of shortening the hours of work of the investment, thus increasing the capital charge per unit of output.

Letting nature take her course does not work out, as is seen in the coal industry. Competition caused the capacity of individual mines to be increased when the need of the industry was for reduced capacity, and the other mines have largely refused to be eliminated. In manufacturing there has been much the same course, striving for lower costs generally taking the form of increasing output. It is too bad that costs cannot be reduced in an attractive way that would reduce capacity at the same time.

Cures for Over-Production

ORTHODOX economists pronounce that there can be no such thing as over-production, but that is academic. Everyone knows that there are unbalances which result in excessive production of some commodities. Such over-production leads to accumulation of unsold stocks and depression of prices.

The prime lessons to be drawn out of the recession in American business during the last nine or ten months are that the stocks of goods permeating an industrial system are larger than commonly supposed; and that our new system of industrial statistics, which is not yet more than ten years old, is still too imperfect for unerring industrial government. Anyhow, the establishment of some very low commodity prices, even below the levels of 1913, is a fact that is uncomfortable to many producers. This leads to a major economic consideration.

It is classic economic theory that low prices carry their own cure. Having in mind the existence of a marginal production the unprofitable is supposed to be gradually extinguished until supply and demand come into equilibrium with the survival of only the fittest and the immobilization of the unfit. If, however, there be a surplus production on the part of a group of producers who are equally fit, it is obvious that the classic economic theory ceases to operate for the reason that there is no marginal production and no unfit. This condition is known to exist in some important industries. It may be a consequence of modern engineering which has offset industrial disadvantages by the introduction of superior mechanization and thus has produced equality.

What then is to be done? It is toward the solution of this problem that modern industrial management is now groping. The restriction of production to fit demand at remunerative prices is urged by the Federal Farm Board and the Federal Oil Conservation Board. It may be assumed therefore that this is sanctioned by present political policy. The copper producers are trying to conform to such a formula, which is an abandonment of laissez faire, and such an abandonment is obviously necessary when the principle ceases to be operative in the way that we have previously explained.

The economic trend is therefore toward industrial cooperation and the adjustment of production to consumptive requirements on the basis of a price which will be reasonably remunerative to the capital that is employed. Oppression is not to be feared, for intelligent management will ever desire to expand its market, not strangle it. Even monopolies thus behave. In overbuilt industries the greatest restraint is the fact that they are overbuilt, for so long as that condition exists the greatest aspiration will ever be to bring idle plant into use, and that implies the fostering and favoring of consumption.

It follows then that there must be industrial information, meaning statistical (which is simply a numerical expression of knowledge), far superior to anything that has yet been developed outside of a few monopolized industries. If a situation be thoroughly known, the component parts of an industry or new adventurers into it will be less prone to do bad things than if they do not know. Some European cartels have recently failed out of ignorance, whereas with knowledge there might have been no need for any such convention, which usually develops jealousies and controversies.

Under our new conditions the soundness of any industry has become a function of its intelligence. It is not intelligent to provide excessive plant for the production of goods and then sacrifice all profit on invested capital by competitive selling in order to keep plants in operation. Nor is it intelligent of the body politic to desire such a development.

Glorifying Metal Furniture

THOSE of us who have wondered at the way a few ounces of copper and zinc, worth 14c. and 5c. a pound respectively in the ingot, sell for 75c. in the form of a brass coat hook are coming to believe that the hardware industry is not wholly alive to its opportunities.

This feeling is enhanced by observing the displays of modernistic furniture, liberally employing white shining metal, steel, rustless steel, aluminum. Persuasive advertising entices the home builder to buy. "Modernism Adopts a Metal Formula" the display lines say, "And many are the blessings thereof. Its infinite durability, its adamantine surface, its streamline continuity, its resilient comfort . . . all correlations of present-day living."

Well and superlatively said. With the cooperation of the skillful advertising men, the steel and alloy industry can look to new and profitable markets.

The pictures of the advertisements show, among other things, a nest of three tables. The construction is childishly simple. First, make a 2 x 7-ft. rectangle of steel tubing; then bend it in the form of an inverted U. Weld on a flat plate of metal for the top, and the fabrication is complete. The advertisement describes the finish: "Tubular brushed steel with black lacquer tops. Each piece priced according to size. The set complete, $105."

Just about what the manufacturer paid for a ton of the material.

Purchasing Agents' June Convention Program

Among features on the tentative program for the Fifteenth Annual International Convention and Informashow of the National Association of Purchasing Agents, at the Hotel Stevens, Chicago, June 16-19, are the following:

June 16

Address: "General Business Outlook," by Franklyn Hobbs, director of research, Central Trust Co. of Illinois, Chicago. Discussion, led by E. H. Weaver, purchasing agent, Union Oil Co. of California, Seattle, Wash.

Address: "What Affects Community Prices?" by Dr. H. Parker Willis, editor, *Journal of Commerce*, and Professor of Banking, Columbia University, New York. Discussion. led by Ralph D. Berry, purchasing agent, Davol Rubber Co., Providence.

General Commodity Session on "Alloy Steel." Presiding officer, D. B. Robinson, purchasing agent, Tri-State Telephone & Telegraph Co., St. Paul, Minn.

Address: "Alloy Steels," by B. F. Fairless, first vice-president, Republic Steel Corporation. Discussion, led by B. C. Sawyer, purchasing agent, Bethlehem Fabricators, Inc., Bethlehem, Pa.

Dinner meeting of Iron and Steel Committee. Presiding officer, W. W. MacMillen, chairman, and general purchasing agent, National Malleable & Steel Castings Co., Cleveland. Report by Chairman on committee activities.

Address: "What the Scrap Institute Is Doing," by Benjamin Schwartz, director general, Institute of Scrap Iron and Steel, New York.

Address: "Tool Steel," by Prof. John F. Keller, Purdue University.

June 18

Financial Group. Presiding officer, R. E. Flynn, secretary, and purchasing agent, Union Guardian Trust Co., Detroit.

"Standardization of Steel Office Equipment," by C. G. Bunnell, purchasing agent, Westinghouse Electric & Mfg. Co., East Pittsburgh.

Committee Session on Iron and Steel. Presiding officer, W. W. MacMillen, chairman.

Address: "Color Marking of Steel," by E. H. Cordes, purchasing agent, Stacey Mfg. Co., Cincinnati.

Address: "Foundry Practices," by J. W. Hargate, purchasing agent, Granite City Steel Works, St. Louis.

Address: "Alloy Steel from a Scrap Standpoint," by E. G. Howell, director of research, Institute of Scrap Iron and Steel, New York.

Paper before Transportation Group: "Non-Ferrous Ingot Metals," by G. H. Clamer, president and general manager, Ajax Metal Co., Philadelphia.

General Session. Presiding officer, T. S. Elliott, purchasing agent, Babcock-Wilcox & Goldie McCulloch, Ltd., Galt, Ontario.

Address: "Can Purchasing Be Over Centralized?" by Norman Aeby, purchasing agent, Johns-Manville Corporation, Waukegan, Ill. Discussion, led by George M. Tisdale, director of purchases, United States Rubber Co., New York.

Address: "Trade Associations and the Business Survey Conference," by Hugh P. Baker, manager, Trade Association Department, Chamber of Commerce of the United States, Washington. Discussion, led by Frank H. MacKnight, purchasing agent, Westinghouse Air Brake Co., Wilmerding, Pa.

Address, by Alvan T. Simonds, president, Simonds Saw & Steel Co., Fitchburg, Mass. Discussion, led by Homer Whitman, purchasing agent, Hooker Electro Chemical Co., Niagara Falls, N. Y.

Auto Parts Makers Report Increasing Business

"Despite the abnormally low rate of activity in the automobile field in general during the first quarter of 1930, those accessory and parts companies which number among their customers the manufacturers of low-priced automobiles have made comparatively creditable showings for the quarter," says a statement issued by Otis & Co., investment bankers. "The Wilcox Rich Corporation, which supplies the majority of automobile manufacturers and which also makes valves and rings for the two companies dominating the low-priced automobile field, reported net earnings of $510,997, after taxes, for the first quarter of 1930, as compared with $484,451 for the first quarter of 1929. The Wilcox Rich Corporation reports a marked improvement in the upward trend of the automotive industry and states that schedules for the second quarter are greatly in excess of those for the first quarter. The Timken-Detroit Axle Co.'s earnings for the first quarter have not been published, but are understood to be around half of earnings of the entire year of 1929.

"The Eaton Axle & Spring Co., which makes bumpers and caps for the low-priced car field, reported net earnings, after taxes, of $314,749 for the first quarter of 1930, as compared with $469,062 for the corresponding quarter of the previous year; the Eaton company also reports improved business, especially in truck axles, the demand for which has increased rapidly since the first of the year. Both Wilcox and Eaton Axle earned in excess of dividend requirements for the quarter."

A New High-Temperature Heat-Insulating Material

Plans for the establishment of a plant in East St. Louis for the manufacture of Carey aluminite, a new type of high-temperature heat-insulating material, by the Philip Carey Mfg. Co., Cincinnati, have been announced by George C. Smith, director of the industrial bureau of the Industrial Club of St. Louis. For several years the Carey company has been cooperating with the research laboratories of the Aluminum Co. of America.

The basic material for the Aluminite blocks and bricks will be prepared in the East St. Louis plant of the Aluminum Ore Co., which the new plant will adjoin. Here the raw material freshly prepared will be received, processed and turned out in commercial block and brick sizes. At present a small scale commercial plant is in operation where the details of the manufacturing problem are being worked out.

The new material will consist of two types, one for temperatures up to approximately 2000 deg. Fahr. and the other for temperatures up to 2500 deg. The commercial significance of this development lies in the adaptability of the new blocks and bricks for the range from 1500 to 2000 deg., which probably represents the need of about 90 per cent of present high temperature commercial equipment.

Iron Ore Imports Record for First Quarter

While imports of iron ore in March, at 301,340 gross tons, did not make a monthly record, the total was the largest since last July and, added to the January and February figures, made the greatest amount received in any first quarter in our history. This total of 797,315 tons, however, was lower than that of the last quarter of 1929, at 825,210 tons.

The gain in March over February imports was 49 per cent and the gain in the quarter over the first quarter of last year was more than 20 per cent.

More than half of the monthly gain was in imports from Chile, which furnished 68 per cent of the aggregate, with Cuba second at 16 per cent. French Africa, Spain and Sweden made up the bulk of the remainder.

Miscellaneous Activities in Industry

	March, 1930	February, 1930	March, 1929
Steel barrels made(a)	749,907(b)	604,709	742,165
do., three months	1,937,023(c)	.....	1,868,055
do., shipped(a)	764,172(b)	599,324	743,407
do., do., (d)	518,758	.....	.....
do., unfilled orders(a)	1,807,913(e)	1,592,982	1,470,258
Babbitt-metal consumed(a), lb	5,051,575(f)	3,426,576	6,465,613
Electric power production(g)	8,164,080	7,622,963	7,989,000
do. by water-power	3,259,853	2,704,054	3,147,000

(a) United States Department of Commerce.
(b) Largest total since last August.
(c) Largest total ever reported.
(d) By members of Steel Barrel Manufacturers Institute.
(e) Largest total since Dec. 31, 1926.
(f) Largest total since last October.
(g) By public utility power plants, thousands of kwhr.; figures from United States Geological Survey.

The Week in Business

Drift of Current Financial and Economic Opinion

LITTLE of an optimistic nature is found by the week's reviewers. Alexander Hamilton Institute finds some indicators revealing a slight betterment, while others "reflect set-backs. . . . Wholesale trade made a sorry showing compared with last year. Sharp curtailment was experienced in every section of the United States."

Taking the same view, United Business Service does not look for any sustained recovery until late summer or early autumn. An encouraging feature is noted by the New York Federal Reserve Bank, however, in an increase in savings bank deposits "rather more rapid than usual for this time of year." This the bank regards as a resumption of the interrupted normal trend of growth.

That cheap money is no panacea for such a world-wide condition as we have is the conclusion of *Commercial & Financial Chronicle*, which notes that outside the United States trade depression was already widely prevalent before the stock market collapse here. "Further reduction in central bank rates," that journal says, "can hardly be considered a favorable development, being indicative rather of the widening sweep and growing intensity of trade depression in all parts of the globe." National Industrial Conference Board concurs in this, noting a fairly low rate of business activity in three of the important commercial centers of the world.

Stock Market Not Main Cause

The slowness of recovery, thinks the National City Bank economist, confirms the view that the stock market crash was not the main cause of the industrial disturbance. But it was a "feature which has contributed substantially to the general confusion and demoralization which followed."

Overdevelopment of production of the principal commodities of world trade is blamed for the price situation, now giving so much concern. The City bank explains this, in part, by the "extraordinary stimulus given by the war to the production of such commodities, outside of Europe, in part by progress made in the science and methods of production since the war, and in part by efforts of governments to protect domestic industries and control prices with that end in view."

Expects Further Improvement

That present and prospective ease in money is clearly favorable to business expansion, however, and to stabilization and recovery of commodity prices, is the conclusion of the Harvard Economic Society, which believes that the "period of uncertainty in commodity markets will not be prolonged. Business activity has shown about the usual rate of increase this spring, and further improvement is to be expected."

Inland and Wheeling Report Earnings

The Inland Steel Co. reports net profits for the first quarter of $2,721,317, as compared with $2,291,442 in the first quarter of 1929.

The Wheeling Steel Corporation had net profit of $1,253,224 in the first quarter, as compared with $1,795,243 in the first quarter of last year. Its surplus as of March 31, was $18,233,690.

Will Present Exchange Paper in England

Fred J. Walls, chief metallurgist, Wilson Foundry & Machine Co., Pontiac, Mich., has been selected to present the 1930 exchange paper of the American Foundrymen's Association before the June meeting of the Institute of British Foundrymen. His subject will be "Briquetting of Cast Iron Borings for Use in Cupola Charges." This company specializes in the production of automobile castings.

Mr. Walls, a native of Oakland County, Mich., in 1912 entered the University of Michigan, where he spent three years specializing in metallurgy. On leaving college, he was employed for a period with the Packard Motor Car Co., Detroit, and the Consolidated Mfg. Co., Toledo, Ohio. In 1915, he became associated with the Wilson company and was promoted to his present position in 1923. Besides his membership in the foundrymen's association, he is also a member of the American Society for Steel Treating and the American Society for Testing Materials.

Seventy-fifth Anniversary of Phoenix Iron Co.

The Phoenix Iron Co., Phoenixville, Pa., one of the oldest rolling mills in the United States, reached its seventy-fifth anniversary on April 27. Established in 1855 as a rolling mill to produce beams, shapes and some rails by members of the Reeves family, who had been in the iron business since 1790, it has continuously remained in executive control of the same family.

Succeeding Reeves, Buck & Co., Phoenixville, who had operated a rail mill and blast furnaces, the company was one of the first to roll beams, furnishing them up to 9 in. It was also one of the first mills in the country to roll beams up to 15 in., and it now produces 20-in. beams.

The company played a part in the Civil War by engaging in production of the Griffin gun, developed by John Griffin, superintendent of the mill at that time. During the war, about 1300 of these guns were furnished to the Union Army. Of these, the first order of 300 was completed and ready for inspection on Oct. 31, 1861.

Canadian Steel Industry Welcomes Protection

TORONTO, ONT., May 5.—Widespread advances in Canadian tariff rates, as presented in the federal budget on May 1, was Minister of Finance C. A. Dunning's reply to the oft-repeated demands of Canadian iron and steel interests for more protection for their industry. In his address Mr. Dunning said, "Canada will wage tariff war with no country, but its tariff favors will go to its best customers; it will seek to facilitate trade with those facilitating its own export trade."

For several years officials of the leading steel companies of Canada have been engaged in laying their requirements before the Government through the Advisory Board on Tariff and Taxation, which completed its official duties in this respect almost a year ago. The new tariff announcement indicates that the Government followed fairly closely the demands, as presented to the tariff board, and in one or two instances the changes exceeded the requests made by the steel interests, while in some no action was taken.

Officials of Canadian steel companies commend the action taken by the Government to protect their industry, and some have already announced plans for extending the scope of their operations and introducing new lines of manufacture.

Iron Output Increased in April

Daily Rate Gained 1347 Tons or 1 1/3 Per Cent Over March—Net Loss of Two Furnaces

RETURNS from all producing companies show that April output of pig iron increased about 1 1/3 per cent over March.

Production of coke pig iron in April was 3,181,868 gross tons or 106,062 tons per day for the 30 days. This compares with 3,246,171 tons or 104,715 tons per day for the 31 days in March. The increase last month in the daily rate was therefore 1347 tons or 1.29 per cent. The rate of output was back again to that of last November, when the daily production was 106,047 tons.

Comparisons with other periods show that the April daily rate this year is the smallest for that month since 1922, when the daily rate for April was 69,070 tons. The production for the first four months this year was 12,094,423 tons, which is 13.7 per cent under the 14,025,653 tons to May 1, last year. It is only a little less than the same four months in 1928 at 12,155,065 tons. Since 1916 there have been 10 years in which the four months' production has been larger than this year.

There was a net loss of two furnaces in April—seven blown in and nine shut down. This compares with 10 blown in during March and four shut down—a net gain of six. This is the first month this year to show a net loss in active stacks.

Operating Rate on May 1

For the 183 furnaces active on May 1 the operating rate is estimated at 104,770 tons per day. This compares with 106,080 tons per day for the 185 furnaces active on April 1.

Of the seven furnaces blown in last month four were independent steel

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1926—Gross Tons

	1926	1927	1928	1929	1930
Jan.	106,974	100,123	92,573	111,044	91,209
Feb.	104,408	105,024	100,004	114,507	101,390
Mar.	111,032	112,366	103,215	119,822	104,715
Apr.	115,004	114,074	106,183	122,087	106,062
May	112,304	109,385	105,931	125,745	.....
June	107,844	102,988	102,733	123,908	.....
½ year	109,660	107,351	101,763	119,564	.....
July	103,978	95,199	99,091	122,100	.....
Aug.	103,241	95,073	101,180	121,151	.....
Sept.	104,543	92,498	102,077	116,585	.....
Oct.	107,553	89,810	108,832	115,745	.....
Nov.	107,890	88,279	110,084	106,047	.....
Dec.	99,712	86,960	108,705	91,513	.....
Year	107,043	99,266	103,382	115,851	.....

Pig Iron Production by Districts, Gross Tons

	April (30 days)	March (31 days)	Feb. (28 days)	Jan. (31 days)
New York and Mass.	225,752	219,033	184,985	193,367
Lehigh Valley	85,179	93,999	82,465	85,835
Schuylkill Valley	53,216	64,727	64,708	68,439
Lower Susq. and Lebanon Valley	43,173	38,984	36,524	30,320
Pittsburgh district	663,679	670,100	576,427	613,745
Shenango Valley	67,106	68,309	63,825	47,518
Western Pennsylvania	120,415	124,410	107,210	100,256
Maryland, Va. and Ky.	120,786	133,005	109,587	98,331
Wheeling district	156,170	116,715	106,896	113,867
Mahoning Valley	264,319	282,667	251,262	220,567
Central and North'n Ohio	275,700	313,805	264,110	268,861
Southern Ohio	48,463	49,410	44,502	49,679
Illinois and Indiana	682,171	694,759	613,915	583,161
Mich., Minn., Mo., Wis. Colo. and Utah	140,186	129,392	116,505	130,146
Alabama	233,972	245,875	215,999	220,781
Tennessee	1,581	981		2,591
Total	3,181,868	3,246,171	2,838,920	2,827,464

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
April, 1929	95,680	26,407	122,087
May	100,174	25,571	125,745
June	99,993	23,915	123,908
July	98,044	24,056	122,100
August	98,900	22,251	121,151
September	95,426	21,159	116,585
October	93,644	22,101	115,745
November	83,276	22,771	106,047
December	68,152	23,361	91,513
January, 1930	71,447	19,762	91,209
February	81,580	19,810	101,390
March	83,900	20,815	104,715
April	85,489	20,573	106,062

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

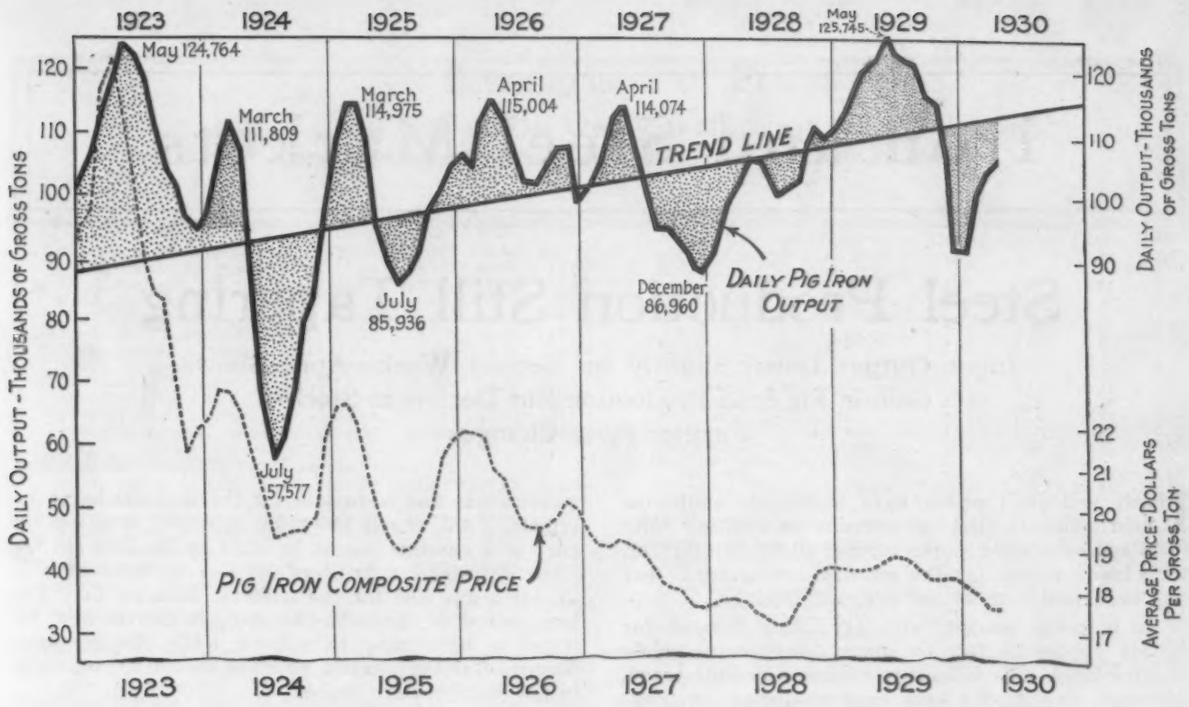
Furnaces	May 1 Number in Blast	May 1 Capacity per Day	April 1 Number in Blast	April 1 Capacity per Day
New York:				
Buffalo	11	5,900	12	6,490
Other New York and Mass.	3	1,110	3	1,060
New Jersey	..	....	0	....
Pennsylvania:				
Lehigh Valley	6	2,840*	6	3,030*
Schuylkill Valley	3	1,670	4	2,090
Susquehanna Valley	2	1,345	2	1,230
Ferromanganese	1	90	1	70
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	33	21,070	34	22,140
Ferro. and Spiegel.	3	595	3	605
Shenango Valley	4	2,235	4	2,200
Western Pennsylvania	6	3,285	7	3,740
Ferromanganese	2	395	2	385
Maryland	5	3,360	5	3,640
Wheeling District	8	5,340	6	3,765
Ohio:				
Mahoning Valley	14	8,810	14	8,730
Central and Northern	15	9,005	17	10,120
Southern	4	1,615	4	1,595
Illinois and Indiana	33	22,920	32	22,410
Mich., Wis. and Min.	6	2,870	5	2,385
Colo., Mo. and Utah	4	1,800	4	1,790
The South:				
Virginia	1	245	1	240
Ferromanganese	0	....	0	....
Kentucky	1	420	1	405
Alabama	16	7,685	16	7,870
Ferromanganese	1	110	1	60
Tennessee	1	55	1	30
Total	183	104,770	185	106,080

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1928—Gross Tons

	1928	1929	1930
Jan.	2,869,761	3,444,370	2,827,464
Feb.	2,900,126	3,206,185	2,838,920
Mar.	3,199,674	3,714,473	3,246,171
Apr.	3,185,504	3,662,625	3,181,868
4 months	12,155,065	14,025,653	12,094,423
May	3,283,856	3,898,082	.....
June	3,082,000	3,717,225	.....
½ year	18,520,921	21,640,960	.....
July	3,071,824	3,785,120	.....
Aug.	3,136,570	3,755,680	.....
Sept.	3,062,314	3,497,564	.....
Oct.	3,373,806	3,583,118	.....
Nov.	3,302,523	3,181,411	.....
Dec.	3,369,846	2,836,916	.....
Year*	37,837,804	42,285,769	.....

*These totals do not include charcoal pig iron. The 1929 production of this iron was 138,193 gross tons.



Daily Production So Far in 1930 Is About 10 Per Cent Under Theoretical Needs

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 1,275,000 *tons*

company stacks, two belonged to the Steel Corporation and one was a merchant furnace. The nine furnaces shut down were distributed as follows: 2 Steel Corporation, 5 independent steel companies and 2 merchant stacks.

Steel-Making Iron Increased

There was an increase in April of 1.9 per cent in steel-making iron or 85,489 tons per day compared with 83,900 tons daily in March. The merchant iron declined from 20,815 tons per day in March to 20,573 tons in April.

Large Ferromanganese Output

The largest ferromanganese production this year at 27,777 tons was made in April. The next highest was 27,260 tons in January. The output to May 1 is 1885 tons less than for the same four months last year but exceeds the same period in 1928.

Large New Furnace Blown In

A new 600-ton furnace of the Wisconsin Steel Co., at Chicago, was blown in April 21. At the same time an old stack was blown out to be scrapped. Thus the number of possibly active furnaces still stands at 315, as stated in THE IRON AGE, April 10, page 1103.

Furnaces Blown In and Out

The following furnaces were blown in during April: One Midland furnace of the Pittsburgh Crucible Steel Co. in the Pittsburgh district; one Newcastle furnace of the Carnegie Steel Co. in the Shenango Valley; No. 1 LaBelle furnace of the Wheeling Steel Corporation and No. 1 furnace of the Weirton Steel Co. in the Wheeling district; the new furnace of the Wisconsin Steel Co. and one South Chicago furnace of the Illinois Steel Co. in Illinois; and one Detroit furnace of the M. A. Hanna Co. in Michigan.

Furnaces blown out or banked during April were: One Lackawanna furnace of the Bethlehem Steel Corporation in the Buffalo district; the Delaware River furnace in the Schuylkill Valley; No. 2 Clairton furnace of the Carnegie Steel Co. and No. 4 Monongahela furnace of the National Tube Co. in the Pittsburgh district; one Cambria furnace of the Bethlehem Steel Corporation in western Pennsylvania; the Sharpsville furnace in the Shenango Valley; No. 2 furnace of the Otis Steel Co. and No. 4 River furnace of the Corrigan-McKinney Steel Co. in northern Ohio, and one furnace of the Wisconsin Steel Co. in Illinois.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1928	1929	1930	1928	1929	1930
Jan.	2,155,133	2,651,416	2,214,875	22,298	28,208	27,260
Feb.	2,274,880	2,498,901	2,284,234	19,320	25,978	21,310
Mar.	2,588,158	2,959,295	2,600,980	27,912	24,978	23,345
Apr.	2,555,500	2,826,028	2,564,681	18,405	22,413	27,777
4 months	9,573,671	10,935,640	9,664,770	87,935	101,577	99,692
May	2,652,872	3,105,404	.....	29,940	25,896	.....
June	2,448,905	2,999,798	.....	32,088	33,363	.....
½ year	14,675,448	17,040,842	.....	149,963	160,836	.....
July	2,464,896	3,039,370	.....	32,909	31,040	.....
Aug.	2,561,904	3,065,874	.....	24,583	28,461	.....
Sept.	2,477,695	2,862,799	.....	22,278	27,505	.....
Oct.	2,729,589	2,902,960	.....	23,939	31,108	.....
Nov.	2,654,211	2,498,291	.....	29,773	31,866	.....
Dec.	2,647,863	2,112,704	.....	28,618	28,564	.....
Year	30,211,606	33,522,840	.....	312,063	339,380	.....

*Includes output of merchant furnaces.

Iron and Steel Markets

Steel Production Still Tapering

Ingot Output Down Slightly for Second Week—April Shows Gain in Pig Iron Production But Decline in Steel—Further Price Changes

IRON and steel prices have undergone additional readjustments, buying remains exceedingly cautious and production shows further slight curtailment, with ingot output for the country averaging 77 per cent compared with 78 per cent last week.

In a spotty market, with expanding demand for certain products offset by diminishing requirements in other lines, it is difficult to discern a definite trend. Although steel plants have been producing considerably less than in 1929, their output compares favorably with that of previous years. Ingot production in April, at 159,358 tons a day, fell 3.4 per cent below the March rate, but was the largest for any fourth month save in 1929 and 1928. Output in the first third of this year has been exceeded only by the corresponding periods in 1929, 1928 and 1926.

Pig iron production makes a less favorable showing. According to blast furnace returns to THE IRON AGE, April output was 3,181,868 tons, or 106.062 tons a day, compared with 3,246,171 tons, or 104,715 tons a day, in March, a gain in daily rate of 1347 tons, or 1.31 per cent. However, the April rate was the smallest for any fourth month since 1922. Output for the first third of the year, at 12,094,423 tons, has been exceeded in 10 of the last 14 years.

Price weakness, although still evident, is not a new development in iron and steel, since the trend of the market has been downward since the middle of 1929. As measured by THE IRON AGE composite for finished steel, prices are $3.68 a net ton lower than 12 months ago and the recession in individual products has been even more severe, in the case of wire nails amounting to $10 a ton.

The protracted character of the decline in prices has led some of the more hopeful spirits in the industry to look for a turn, although signs of such a change are still lacking.

Plates and shapes have come into line with bars, now being more commonly quotable at 1.75c., Pittsburgh, or $1 a ton below their recent level. Prices on merchant wire products have been revised to conform with the recent reductions on wire nails, and wire rods have been cut $2 to $36 a gross ton. Galvanized sheets are irregular in the East but fairly steady elsewhere.

Among the primary materials, heavy melting scrap is off another 25c. a ton at Chicago, St. Louis and Buffalo, while pig iron has been reduced 50c. a ton at St. Louis and Cleveland.

Pipe line awards continue to be an outstanding feature of steel demand. The National Tube Co. has booked a total of over 300,000 tons in three weeks. On top of 480 miles of 24-in. seamless pipe for a Southwestern gas line to be laid for the H. L. Doherty interests, it will supply 250 miles of 6⅝-in. seamless for part of a gasoline line to be built by the Sun Oil Co. from Philadelphia to Cleveland and 80 miles of 8⅝-in. for a gas line for the Atlantic Refining Co. The long talked of Amarillo-Chicago gas line is now believed to be coming to a head, while the Southern Natural Gas Corporation plans to lay an 800-mile line in the Southwestern States.

Automotive demand for steel has again expanded slightly, although the improvement is accounted for entirely by the manufacturers of light cars. April motor car output is reported to have exceeded 500,000, compared with 422,000 in the previous month and 621,000 cars in April, 1929. If May shows a gain over April it will be because of expanded schedules in the Ford and Chevrolet plants.

Reinforcing bar awards, reflecting an expansion in public work, total 9000 tons, while the amount of business that has come up for bids, 16,000 tons, is the second largest total reported this year.

Prospective structural steel work is assuming promising proportions in the Chicago district, but total awards for the country this week, at 27,000 tons, show a sharp decline from the 42,000 tons reported a week ago.

Railroad demand has held up better than was anticipated. Suspensions of shipments against steel contracts have turned out to be exceptional, and an encouraging amount of new business has been placed. A Southwestern road has bought 7000 tons of tie plates and 4000 tons of track spikes. Recent railroad awards of bridge work total 11,000 tons and a bridge for the Santa Fe at Chillicothe, Ill., on which bids are now being taken, will require 8000 tons.

The steel requirements of the farm equipment industry are undiminished and tin plate specifications still support a mill operation of 80 per cent. Makers of metal lath and electric refrigerators are taking considerable steel, and there is a steady demand for electrical sheets.

The outlook for steel exports is not as gloomy as current generalizations regarding world-wide depression would lead one to expect. Steel producers report that prospects are encouraging in a number of countries in the Western Hemisphere, as well as elsewhere.

THE IRON AGE composite price for finished steel has dropped to a new low for the year, being now 2.228c. a lb., compared with 2.242c. last week and 2.264c. the week before. The pig iron composite is unchanged at $17.67 a gross ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron Per Gross Ton:	May 6, 1930	Apr. 29, 1930	Apr. 8, 1930	May 7, 1929
No. 2 fdy., Philadelphia	$20.26	$20.26	$20.26	$21.76
No. 2, Valley furnace	18.50	18.50	18.50	18.50
No. 2 Southern, Cin'ti	16.69	16.69	16.69	18.69
No. 2, Birmingham	14.00	14.00	14.00	15.00
No. 2 foundry, Chicago*	19.00	19.00	19.50	20.00
Basic, del'd eastern Pa.	18.75	18.75	19.00	20.25
Basic, Valley furnace	18.50	18.50	18.50	18.00
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	20.76
Malleable, Chicago*	19.00	19.00	19.50	20.00
Malleable, Valley	19.00	19.00	19.00	19.00
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	94.00	94.00	94.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	33.00	33.00	33.00	36.00
Sheet bars, Pittsburgh	33.00	33.00	33.00	36.00
Slabs, Pittsburgh	33.00	33.00	33.00	36.00
Forging billets, Pittsburgh	38.00	38.00	38.00	41.00
Wire rods, Pittsburgh	*36.00*	38.00	38.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	*1.80*	1.85	1.85	1.85
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.75	1.75	1.80	1.95
Bars, Chicago	*1.85*	1.90	1.90	2.05
Bars, Cleveland	1.80	1.80	1.80	1.95
Bars, New York	2.09	2.09	2.14	2.29
Tank plates, Pittsburgh	*1.75*	1.80	1.80	1.95
Tank plates, Chicago	*1.85*	1.90	1.90	2.05
Tank plates, New York	2.02½	2.02½	2.07½	2.22½
Structural shapes, Pittsburgh	*1.75*	1.80	1.80	1.95
Structural shapes, Chicago	*1.85*	1.90	1.90	2.05
Structural shapes, New York	*1.94½*	1.99½	2.04½	2.19½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.30
Hot-rolled strips, Pittsburgh	1.70	1.70	1.70	1.90
Cold-rolled strips, Pittsburgh	2.55	2.55	2.55	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel, *Per Lb. to Large Buyers:*	May 6, 1930 Cents	Apr. 29, 1930 Cents	Apr. 8, 1930 Cents	May 7, 1929 Cents
Sheets, black, No. 24, P'gh.	2.55	2.55	2.55	2.85
Sheets, black, No. 24, Chicago dist. mill	2.65	2.65	2.65	3.05
Sheets, galv., No. 24, P'gh.	3.30	3.30	3.30	3.60
Sheets, galv., No. 24, Chicago dist. mill	3.40	3.40	3.40	3.80
Sheets, blue, No. 13, P'gh.	2.15	2.15	2.25	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.25	2.25	2.35	2.30
Wire nails, Pittsburgh	2.15	2.15	2.15	2.65
Wire nails, Chicago dist mill	2.20	2.20	2.35	2.70
Plain wire, Pittsburgh	2.30	2.30	2.40	2.50
Plain wire, Chicago dist. mill	2.35	2.35	2.45	2.55
Barbed wire, galv., P'gh.	*2.80*	2.95	2.95	3.30
Barbed wire, galv., Chicago dist. mill	*2.85*	3.00	3.00	3.35
Tin plate, 100 lb. box, P'gh.	$5.25	$5.25	$5.25	$5.35
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	$15.75	$15.75	$16.00	$18.25
Heavy melting steel, Phila.	13.50	13.50	14.00	16.50
Heavy melting steel, Ch'go	*12.75*	13.00	13.00	15.50
Carwheels, Chicago	*14.00*	14.25	14.50	14.50
Carwheels, Philadelphia	15.00	15.00	15.00	16.50
No. 1 cast, Pittsburgh	14.25	14.25	14.50	15.00
No. 1 cast, Philadelphia	*14.00*	15.00	15.00	16.50
No. 1 cast, Ch'go (net ton)	13.25	13.25	13.50	15.50
No. 1 RR. wrot., Phila.	15.00	15.00	15.00	16.00
No. 1 RR. wrot., Ch'go (net)	11.25	11.25	12.25	14.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$2.75
Foundry coke, prompt	3.50	3.50	3.50	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*13.12½*	14.12½	18.12½	18.12½
Electrolytic copper, refinery	*12.25*	13.75	17.75	17.75
Tin (Straits), New York	*32.00*	34.37½	36.37½	44.00
Zinc, East St. Louis	*4.65*	4.72½	5.00	6.60
Zinc, New York	*5.00*	5.07½	5.35	6.95
Lead, St. Louis	*5.35*	5.40	5.40	6.80
Lead, New York	*5.40*	5.50	5.50	7.00
Antimony (Asiatic), N. Y.	*7.50*	7.60	8.00	9.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

PITTSBURGH

Steel Demand Merely Holding Its Own—Motor Car Orders Gain Slightly

PITTSBURGH, May 6.—Although specifications for one or two lines of steel products have shown slight improvement in the last week or two, tonnage releases in the aggregate are doing well to hold their own in this district. The automobile industry was responsible for a part of the recent improvement in demand for hot-rolled strip and alloy steel bars, and a few companies would have little complaint to make if other consuming lines were as active now as the automotive.

Demand from the Michigan territory is spotty nevertheless, and is not well sustained except in the case of the two largest producers. Other motor car builders are adjusting their production so closely to consumer demand that mid-week changes in weather have brought reduced schedules in at least one instance.

Among the other important consuming industries which are maintaining their steel consumption at a fair rate are the agricultural implement, the electrical and the metal lath. Considerable sheet steel is being taken by makers of electric refrigerators, who are just now at the height of their season, and a steady demand for electrical sheets has kept up. In direct contrast are the radio makers, who have never rallied to any great extent from the sharp depression which they entered at the end of the year.

The requirements of railroad equipment builders have been rather disappointing in the last month, and the railroads themselves are watching their purchases very closely. On the other hand, releases on rail and track accessories have been heavy and promise to continue so for several weeks.

The building industry is still discouraging. Although a few lines, such as metal lath, are fairly active, sheet steel building products in general are quiet, and other lines, including standard pipe, radiators and sanitary ware, and metal roofing, are at least 20 per cent under the normal rate of demand at this season. Civil engineering and industrial building projects are taking considerable tonnages of reinforcing bars, and extensive road-building programs in this vicinity are requiring much reinforcing wire mesh. Fabricated structural steel is not correspondingly active, and awards are slow in being placed. Lack of barge building, together with little buying by the oil companies, has also reduced the operations of steel fabricators.

Steel-making operations in this and nearby districts are holding their own at slightly better than 75 per cent of capacity, although there have been gains in the open-hearth schedules of one or two of the smaller independent companies.

Among the finishing mills, tin plate schedules alone show a decline, and in this line the loss has been slight. Sheet production over a several weeks' period has held at around 70 per cent, with variations of as much as 10

points from week to week. Pipe operations in general are holding at about 60 per cent.

Prices are no weaker, but no tendency toward strength is noticeable. The reduction in mill quotations on wire products announced last week was little more than a recognition of figures which had become increasingly common since the beginning of the quarter, and the sentimental effect on the market has been of little importance. On the heavy hot-rolled products, a 1.75c., Pittsburgh, price is heard more frequently, and the general market on small lots is not above 1.80c. A possible exception might be made in the case of reinforcing bars, on which 1.80c. has thus far been the minimum mill quotation in the immediate district. Sheet and strip prices are still largely nominal, and reported shading in the East on galvanized material has disturbed the Pittsburgh market slightly. Several small mills continue to be very aggressive in solicitation of business, and, although this policy brings out little tonnage, it is constantly a disturbing market factor.

Pig Iron.—Nearly all of the merchant producers in this district have found a slight decline in new buying in the last two weeks, although shipments are holding up fairly well, at least in the case of malleable and basic iron. The foundry grade is less active. The National Radiator Corporation has closed for a small tonnage of foundry iron for its New Castle, Pa., plant, and this is said to have brought the full quoted price of $18.50, Valley. This figure has ruled on other small transactions in the various grades, except possibly basic which has been quieter than usual.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Steel demand on the whole shows no gains, though automotive releases are slightly improved.

* * *

Ingot output remains at about 75 per cent in Pittsburgh and nearby districts.

* * *

Tin plate schedules alone show a decline among finishing mills. Sheet operations average 70 per cent.

* * *

Price structure still weak. On heavy hot-rolled products, 1.75c. is more frequently quoted.

* * *

Downward movement in scrap prices seems to be temporarily checked, although some declines are recorded this week.

Semi-Finished Steel.—Market conditions are unchanged, except in the case of wire rods, which have been reduced $2 a ton and are now quoted at $36 a ton, Pittsburgh or Cleveland. Billets, slabs and sheet bars are nominally held at $33, Pittsburgh or Youngstown.

Bars, Plates and Shapes.—This market is still buoyed up by expectations of future improvement, as present demand leaves much to be desired. Although shipments of structural shapes and reinforcing bars have improved slightly in the last few weeks, demand is far below normal for this time of the year with most companies. This is particularly true of fabricated structural steel. Shops in the Pittsburgh district are not engaged at an average of more than 50 per cent of capacity, although one or two large units are maintaining a fair operation. The same situation exists in the case of barges, as two or three barge yards are not operating and only one or two are normally busy. Demand for plates from other sources is also light. The oil industry is not active and fabricators serving it are badly in need of business. Price concessions of varying amounts reported from other sections of the country on large tonnages are reflected only occasionally in the immediate Pittsburgh territory.

Rail and Track Accessories.—Releases from the railroads on track accessories, as well as on other steel products, are keeping up at a good rate this month, but new buying is negligible. The principal makers are running their mills at about the same rate as during the same period last year, and the heavy rail mill in the district is well engaged. Light rails are very quiet, and the $36, Pittsburgh, quotation is being shaded frequently to meet the competition of rerolling mills, which are quoting $34.

Tubular Goods.—The market shows little activity, with the possible exception of line pipe. The Steel Corporation's subsidiary has booked enough orders in the last week or two to run its new seamless units at capacity for several months after they begin operation, but other pipe makers in this district have not fared so well even on this material. On standard pipe, current demand is considerably below that of 1929, and oil country goods have failed to develop any marked activity. Mechanical tubing and boiler tubing are also quiet, and the pipe and tubing industry in general is not running at more than 60 per cent in this and the Youngstown districts. Prices are well maintained.

Wire Products.—Open reduction of wire and nail prices by the leading producer last week was not unexpected and represents little change in actual selling prices which had prevailed to some extent since the beginning of the quarter. Lagging demand for both merchant and manufacturers' wire products, which had accompanied price weakness, is still in evidence, but shipments of manufacturers' and spring wire have been fairly good and will likely continue at the current rate through May. Merchant wire products are very quiet, with prices reduced to conform with the reduction on nails. Nails are

The Iron Age Composite Prices

Finished Steel

May 6, 1930, 2.228c. a Lb.

One week ago	2.242c.
One month ago	2.264c.
One year ago	2.412c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1930	2.362c., Jan. 7;	2.228c., May 6
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

May 6, 1930, $17.67 a Gross Ton

One week ago	$17.67
One month ago	17.75
One year ago	18.67

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1930	$18.21, Jan. 7;	$17.67, April 29
1929	18.71, May 14;	18.21, Dec. 17
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.75c. to 1.80c.
F.o.b. Chicago	1.85c. to 1.95c.
Del'd Philadelphia	2.07c. to 2.12c.
Del'd New York	2.09c. to 2.14c.
F.o.b. Cleveland	1.80c.
F.o.b. Lackawanna	1.85c. to 1.90c.
F.o.b. Birmingham	2.00c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.	1.75c. to 1.80c.
F.o.b. P'gh mills, cut lengths	2.00c. to 2.05c.
F.o.b. Birmingham, mill lengths	2.00c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.70c. to 1.80c.
F.o.b. Chicago Heights mill	1.80c.
Del'd Philadelphia	2.12c. to 2.22c.

Iron

Common iron, f.o.b. Chicago	1.90c. to 2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.75c. to 1.80c.
F.o.b. Chicago	1.85c. to 1.95c.
F.o.b. Birmingham	2.00c.
Del'd Cleveland	1.94c. to 1.99c.
Del'd Philadelphia	1.95c. to 2.00c.
F.o.b. Coatesville	1.85c. to 1.90c.
F.o.b. Sparrows Point	1.85c. to 1.90c.
F.o.b. Lackawanna	1.85c. to 1.95c.
Del'd New York	2.02½c. to 2.07½c.
C.i.f. Pacific ports	2.20c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.75c. to 1.80c.
F.o.b. Chicago	1.85c. to 1.95c.
F.o.b. Birmingham	2.00c.
F.o.b. Lackawanna	1.85c. to 1.95c.
F.o.b. Bethlehem	1.80c. to 1.90c.
Del'd Cleveland	1.94c. to 1.99c.
Del'd Philadelphia	1.81c. to 1.86c.
Del'd New York	1.94½c. to 2.04½c.
C.i.f. Pacific Ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	1.80c. to 1.90c.
Wider than 6 in., P'gh	1.70c. to 1.80c.
6 in. and narrower, Chicago	1.90c. to 2.00c.
Wider than 6 in., Chicago	1.80c. to 1.90c.
Cooperage stock, P'gh	2.10c. to 2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, P'gh	2.45c. to 2.55c.
Strips, Cleveland	2.55c.
Strips, del'd Chicago	2.85c.
Strips, Worcester	2.70c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.90c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade

	Base per Keg
Standard wire nails	$2.15 to $2.25
Cement coated nails	2.15 to 2.25
Galvanized nails	4.15 to 4.25

	Base per Lb.
Polished staples	2.60c. to 2.70c.
Galvanized staples	2.85c. to 2.90c.
Barbed wire, galvanized	2.80c. to 2.90c.
Annealed fence wire	2.30c. to 2.40c.
Galvanized wire, No. 9	2.75c. to 2.85c.
Woven wire fence (per net ton to retailers)	$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage	2.30c.
Spring wire	3.30c.

(Carload lots, f.o.b. Chicago)

Wire nails	$2.20 to $2.30 (keg)
Annealed fence wire	2.40c. to 2.50c. (lb.)
Bright hard wire to manufacturing trade	2.35c.

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.55 to $2.60
Less carloads, Wheeling or Reading	2.70

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.00c. to 2.10c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.10c. to 2.20c.
No. 10, blue annealed, del'd Phila.	2.32c. to 2.42c.
No. 10, blue annealed, B'ham	2.25c. to 2.30c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.15c. to 2.25c.
No. 13, f.o.b. Chicago dist.	2.25c. to 2.35c.
No. 13, del'd Philadelphia	2.47c. to 2.57c.
No. 13, blue annealed, B'ham	2.40c. to 2.45c.

Continuous Mill Sheets

No. 10 gage, f.o.b. P'gh	1.80c. to 1.90c.
No. 13 gage, f.o.b. P'gh	1.95c. to 2.05c.

(Usual range 24 in. to 48 in. wide)

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.55c. to 2.65c.
No. 24, f.o.b. Chicago dist. mill	2.65c. to 2.75c.
No. 24, del'd Philadelphia	2.97c.
No. 24, f.o.b. Birmingham	2.80c.

Steel Furniture Sheets

No. 24, f.o.b. P'gh	3.80c. to 3.90c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.30c.
No. 24, f.o.b. Chicago dist. mill	3.40c.
No. 24, del'd Cleveland	3.49c.
No. 24, del'd Philadelphia	3.62c.
No. 24, f.o.b. Birmingham	3.45c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill	2.90c. to 3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	3.80c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	3.80c. to 3.90c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C. $10.70	25-lb. coating I.C. $15.90
15-lb. coating I.C. 13.40	30-lb. coating I.C. 16.80
20-lb. coating I.C. 14.60	40-lb. coating I.C. 18.80

Alloy Steel Bars

(F.o.b. makers mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1/2% Nickel)	$0.25
2100	(1 1/4% Nickel)	0.55
2300	(3 1/2% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ½ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.07½
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛	47	21½	¼ and ⅜	+11	+36
¼ to ⅜	53	27½	½	23	5
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18

Lap Weld

2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49½	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

now quoted at $2.15 per 100-lb. keg, Pittsburgh, to the jobbing trade, and $2.25 to retailers. Manufacturers' wire is quoted at 2.30c., Pittsburgh or Cleveland, and the differential at Worcester, Mass., has been reduced from $3 to $2 per ton.

Sheets. — Specifications vary so sharply from week to week that only a long-range view of the market is of much value at this time. The industry in this district is still operating at about 70 per cent of capacity, with the engagement slightly higher on black and galvanized material. Full finishing and jobbing mills are not running at more than 65 per cent, and have dropped down to 60 or less at times during the last month. Makers of metal lath, steel furniture and shelving, electric refrigerators and farm implements are still the principal factors in creating current demand, although a few mills are profiting considerably by heavy production schedules of two or three large automobile makers. Sheet prices are still weak, and recently announced minimum prices are applying on a growing tonnage. Black sheets are quotable at 2.55c. to 2.65c., galvanized at 3.30c., and light plates and blue annealed sheets from jobbing mills at 2c. and 2.15c., respectively.

Tin Plate.—Another week of light specifications has brought further curtailment of mill schedules. Independent companies, which were formerly running extra turns, have curtailed operations slightly, and the leading interest continues at about 80 per cent, a figure which is now fairly representative of the industry as a whole. No adverse crop reports have appeared except in minor fruit growing regions. Demand from the oil industry for containers is very light.

Old Material.—Purchase of a round tonnage of No. 1 heavy melting steel by a Pittsburgh district consumer during the week has given the scrap market a slightly stronger tone. The price reported was $16, and the monthly list of the Baltimore & Ohio Railroad brought 10c. or 15c. more. Dealers are still able to buy scrap for $15.50 and occasionally less, and the market thus remains quotable at $15.50 to $16.

Prices on hydraulic compressed sheets remain nominally unchanged, although this grade is very strong at $15.75, and it is unlikely that the last reported sale at this figure could be duplicated today. Detroit material is being diverted by water to other consuming points, and Pittsburgh dealers are having difficulty in buying at inland Michigan points for shipment to this district. Cast iron carwheels are also up 50c. as a result of the recent railroad sales, but other price changes are downward. The low phosphorus grades are generally weaker to the extent of $1 a ton, and heavy breakable cast has declined, in the absence of further mill buying. Machine shop turnings are also off 50c. a ton, with shipments held up at the principal consuming point.

A mill in the district which has not taken much scrap in recent weeks plans to accept shipments in the near future and further buying may be expected before the middle of the month. Under the circumstances the downward movement in scrap prices seems to be temporarily checked.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.50 to $16.00
No. 2 heavy melting steel	13.50 to 14.00
Scrap rails	14.50 to 15.00
Compressed sheet steel	15.50 to 15.75
Bundled sheets, sides and ends	13.50 to 14.00
Cast iron carwheels	14.00 to 15.00
Sheet bar crops, ordinary	17.00 to 17.50
Heavy breakable cast	11.50 to 12.00
No. 2 railroad wrought	15.50 to 16.00
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	10.50 to 11.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	19.00 to 19.50
Railr. coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.00 to 21.00
Low phos. mill plates	19.00 to 20.00
Low phos. light grades	19.00 to 20.00
Low phos. sheet bar crops	19.50 to 20.50
Heavy steel axle turnings	14.00 to 14.50
Electric Furnace Grades:	
Low phos. punchings	18.50 to 19.00
Heavy steel axle turnings	14.00 to 14.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	21.50 to 22.50
Cupola Grades:	
No. 1 cast	14.00 to 14.50
Rails 3 ft. and under	18.00 to 18.50

Strip Steel.—Hot-rolled strip is still fairly active, with current specifications more than justifying the operating schedules of some companies, and deliveries extended for as much as two weeks on certain sizes. Mills would rather extend deliveries slightly than increase operations too rapidly, as demand is still irregular enough to justify considerable caution. Minimum prices of 1.70c. and 1.80c., Pittsburgh, on hot-rolled material are holding generally; while cold-rolled continues very dull. Prices on the latter are also weak, although local producers are still quoting 2.55c., Pittsburgh, on small tonnages. Demand for cold-rolled strip has shown no improvement, and some makers are making little effort to stimulate a dull market by means of price concessions.

Coal and Coke.—Furnace coke is a shade weaker this week, although the larger operators are not quoting less than $2.60, Connellsville, except on very desirable business. The foundry grade is also in light demand, and with the exception of the premium brands, conditions are more or less chaotic. Slack is still rather scarce and is bringing out better prices than it has for some time.

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.60c.
Galv. sheets (No. 24), 25 or more bundles	4.25c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.20c.
Blue annealed sheets (No. 13)	3.25c.
Galv. corrug. sheets (No. 28), per square	4.13c.
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 lb	$2.75 to 2.85
Wire, galv. soft, base per 100 lb.	3.20 to 3.30
Common wire nails, per keg	2.60 to 2.75
Cement coated nails, per keg	2.65 to 2.80

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

Ingot Capacity Exceeds 63 Million Tons

The survey of capacities for pig iron, ferroalloys and steel ingots, made annually by the American Iron and Steel Institute, has been completed for 1929 and shows the following results:

Pig Iron and Ferroalloys, Gross Tons

	Pig Iron	Ferro-alloys	Total Pig Iron and Ferro-alloys
Dec. 31, 1929	50,921,450	735,230*	51,656,680
Dec. 31, 1928	50,531,665	702,230*	51,233,895

*Annual capacity of blast furnaces only.

Capacity in Steel Ingots, Gross Tons

	Dec. 31, 1928	Dec. 31, 1929
Basic open-hearth	51,389,625	52,710,980
Acid open-hearth	1,088,185	1,022,690
Bessemer	8,513,000	8,532,000
Electric	741,670	773,890
Crucible	26,986	27,986
Totals	61,759,466	63,067,546

The increase is some 2 per cent. A 6 per cent drop in acid open-hearth capacity is shown, but against that an increase in both Bessemer and crucible capacity, a notable increase in electric capacity and 1,321,000 tons or 2½ per cent in basic open-hearth capacity.

New York offices of the Climax Molybdenum Co. have been moved to 295 Madison Avenue.

Henry Prentiss & Co., machine tools, have moved from 149 Broadway, New York, to the new Chrysler Building.

Republic Steel Corporation has moved its New York offices to the new Lincoln Building.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in. Pittsburgh	$33.00
Rerolling, 4-in. and under 10-in., Youngstown	33.00
Rerolling, 4-in. and under 10-in., Cleveland	33.00
Rerolling, 4-in. and under 10-in., Chicago	34.00
Forging quality, Pittsburgh	38.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$33.00
Youngstown	33.00
Cleveland	33.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$33.00
Youngstown	33.00
Cleveland	33.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.80c. to 1.90c.
Universal	1.80c. to 1.90c.
Sheared	1.80c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$36.00
Cleveland	36.00
Chicago	37.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$14.00 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60
Foundry, f.o.b. Connellsville prompt	$3.50 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-products, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, fo.b. W. Pa. mines	90c. to 1.10
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$94.00 to $99.00
Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to 1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to 18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread,	85 and 10
Upset hex. cap screws, S.A.E. thread	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

CHICAGO

Steel Sales Best in a Month—Ingot Output 90 to 95 Per Cent

CHICAGO, May 6.—Demand for finished steel products remains at a high level in this district, and ingot output is well within the range of 90 to 95 per cent of capacity. The count of active steel mill blast furnaces, though down one at the moment, will be back to 27 of 36 before the end of the week.

The Wisconsin Steel Co. has completed and put in operation its new No. 3 stack of 600 tons daily capacity. It has taken out No. 2 furnace for relining and is dismantling its "A" stack, which was 50 years old and of 250-ton capacity. The Illinois Steel Co. will light its tenth furnace at Gary early this week, bringing into use 19 of its 27 furnaces.

With the widespread practice of hand-to-mouth buying, contracts by the quarter become of lesser importance, whereas buying by the month is an increasing factor in the market. Attributable to this situation are sales which are the best in a month and which compare favorably with the average so far this year. Specifications show little variation from the volume that has been reaching mills in recent weeks.

The railroad equipment market is quiet. Figures are being taken on the Illinois Central inquiry, which is the only business of note now before Western car builders.

The prospect of business which will develop in oil-producing regions is excellent. New orders for tank plates total 6000 tons, and new inquiry in the form of tanks and gas lines is shaping. Contrary to the outlook in this field is the knowledge that the peak of rail shipments is past and rolling schedules are pointing downward.

Architects are reporting more work on boards, and the general impression is that the building phase of the steel market will improve. The expansion program of the Illinois Steel Co. is progressing according to schedule and several units may be in operation by the end of the year.

Ferroalloys.—It is reported that a part cargo of English spiegeleisen will be docked at Chicago in the next week or 10 days and that a full cargo is due here in the summer.

Pig Iron.—The first cargo of Buffalo pig iron for the season is due to arrive at Chicago within a day or two. It is reported that the bulk of this cargo is for delivery to a melter in southern Wisconsin. The local iron market is steady at $19 a gross ton, f.o.b. local furnaces. May shipments are holding to the average of April, and schedules for the remainder of the month are well arranged. In fact, shipping instructions on May 5 were well above the total on the fifth day of the preceding month. Production, which is well sold for May and June, will be increased in a few days by the lighting of No. 3 Iroquois furnace, which has been out for relining. There are now in blast two Iroquois, two Federal and the stack at Duluth. Southern and charcoal iron have been quiet this week.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$19.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.50
Malleable, not over 2.25 sil.	19.00
High phosphorus	19.00
Lake Super. charc'l, sil. 1.50	27.04
S'th'n No. 2 fdy.	$18.20 to 19.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Coke.—The price of by-product foundry coke is steady at $8 a ton, local ovens, on such small spot business as is reaching sellers. Shipments continue at the average rate of April.

Reinforcing Bars.—Improvement noted in this market a week ago continues, and, as new work finds its way to bending shops, shipments of reinforcing bars are climbing to the highest point of the year. Of special importance are heavy awards for Illinois road work and like business which is coming from Indiana, Wisconsin and Iowa. New tonnages of similar character are in the making. About 500 tons will be needed soon for bridge foundations for Chicago's outer drive development, which promises the use of large tonnages of bars in the near future.

An encouraging feature of this market is that contractors are better engaged than at any time so far this year, and it is quite evident that financial matters are less difficult to arrange on new construction work. Prices for reinforcing bars are still variable.

Bolts, Nuts and Rivets.—This market shows no change from a week ago. Production is equal to shipments, which are running about 15 per cent below the rate a year ago. Stocks in the hands of producers are said to be complete. Releases from automobile manufacturers are a trifle heavier this week.

Rails and Track Fastenings.—New rail business totals 2500 tons in miscellaneous lots. The peak of the heavy rolling schedules passed with the opening of May and, accordingly, shipments are lower by about 1000 tons a week. The new schedule is expected to hold through the present month, when further curtailment in output will be in order because of the nearness of completion of the heaviest part of the spring track laying program.

The Santa Fe has received authority from the Interstate Commerce Commission to build about 380 miles of new line in New Mexico, Texas and Colorado. This will be undertaken by subsidiaries of the Santa Fe.

Fresh inquiry for standard-section rails is light, though the time is not far distant when secondary purchases will be in order. About 500 tons of track fastenings has been placed.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Plates.—Tank builders are again actively in the market, and orders for plates from this source aggregate 6000 tons. Projects for oil storage tank construction are numerous, and sellers of plates are looking for a substantial volume of orders.

The Southern Natural Gas Corporation is announcing a gas line construction program, which calls for the laying of 800 miles of pipe lines in the Southeastern section of the United States.

Deliveries of plates are easier, the average being about 30 days. Prices continue to show variation, with 1.85c. a lb., Chicago, becoming increasingly common.

Structural Material.—The general impression is that this market cannot at this moment be gaged by actual

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel—	
Under 5 tons	2.85c.
5 tons to 30 tons	2.45c.
30 tons and over	2.00c.
Rail steel reinforcement	1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg.	$2.75 to 2.85
Cement c't'd nails, base per keg	2.75 to 2.85

awards and fresh inquiries, which are measurably lower than a week ago. Architects feel that the bottom has been reached and most of them are actively preparing new plans. Fabricators are still anxiously looking for tonnage to put in their shops and, in the meantime, are finding an increasing volume of work on which they are being asked to submit bids.

Prices for structural material are showing variation, with 1.85c. a lb., Chicago, being done on some tonnages.

Bars.—Bar mills in this district are operating at 85 per cent of capacity. Specifications for mild steel bars are larger than shipments, while sales are the best in four weeks. Tonnage lots are occasionally moving at 1.85c. a lb., Chicago.

The alloy steel bar market is unchanged from a week ago, and the demand for iron bars is very low. The rail steel bar market has shown little variation in the past week, with the exception that demand from barn equipment manufacturers shows slight improvement.

Sheets.—The change in the local sheet market this week is toward lighter demand. Output is not above 70 per cent of capacity. In some cases mills are forced to wait until the second day of the week before sufficient releases have accumulated to lay out satisfactory schedules. Continuity of rolling schedules is largely dependent on orders received from day to day.

Demand for roofing sheets remains very light, but there is hope that a short revival may occur in agricultural districts between the planting period and the first cultivating period. The manufacturing trade is taking a relatively steady volume of sheets, but orders are at extremely close range. This situation prevails somewhat because of uncertainty of the price structure. The stove trade, which has has been dormant since the early part of the year, is taking larger quantities of sheets. Barrel and container manufacturers are enjoying a satisfactory volume of business from distributers of petroleum products.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.70c. to 2.80c.; No. 24 galv., 3.45c.; No. 10 blue ann'l'd, 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cold-rolled Strips.—A price spread is no longer quotable on this commodity. The ruling quotation here is 2.55c. a lb., Cleveland, or 2.85c. delivered Chicago. Specifications are spotty and, on the whole, are no larger than a week ago. Output stands at close to 40 per cent of capacity.

Wire Products.—The wire market continues to drift in a listless manner. Specifications from the manufacturing trade show little change from week to week, and the aggregate is small for this season. Lower quotations announced last week have not served as a stimulant. The jobbing trade is steady, but measurably below what it was the middle of April. Sellers expect, however, that a short period of improvement will come from this source during the interval between the planting season and when cultivating must be done. Wire mill output is variously estimated at between 50 and 55 per cent of capacity.

It had been expected by the trade that lower copper prices might release pending business in cables, insulated wire and the like. However, this improvement has not come. Public utilities are buying cautiously and in close conformity with immediate needs. Radio manufacturers, who are large users of magnet wire, are laying their plans for the fall trade, but to date they have not come into the market for their needs in wire.

Short-range steel buying, best in a month, sustains ingot output of 90 to 95 per cent.

* * *

Expanding requirements of oil industry may offset declining shipments of steel to railroads.

* * *

Signs of improvement continue in building construction.

* * *

Quotations of 1.85c a lb. on plates, shapes and bars more common.

* * *

Scrap market weak. Price decline not halted.

New prices for wire and wire products are given on page 1417.

Cast Iron Pipe.—This market is quieter as measured by the aggregate tonnage of inquiries and lettings. Dayton, Ohio, has placed four miles of 4 to 10-in. pipe with an unnamed bidder, and Delta, Ohio, has ordered 100 tons of pipe for a filtration plant from James B. Clow & Sons. The American Cast Iron Pipe Co. has been awarded 500 tons for a sewage disposal plant at Galesburg, Ill., and the National Cast Iron Pipe Co. has taken 150 tons of 4 to 8-in. pipe for Cygnet, Ohio.

Killbuck, Ohio, will open bids May 12 on 3400 ft of 4-in., 13,000 ft. of 6-in., 1500 ft. of 8-in. and 175 ft. of 10-in. pipe. Fresh inquiries are confined almost wholly to one and two car lots. Prices are holding on business of this kind.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $48.20 to $49.20; Class A and gas pipe, $3 extra.

Old Material.—Prices for iron and steel scrap are nominal in a market which is drifting without support from buyers. Although brokers have sizable orders to be filled, they are pressing hard for commitments in the heavy tonnage grades, and it is quite evident that they wish to go short of the market in expectation that prices will sag and that wider margins of profits may then be had. Up to several days ago, users had paid $13.50 a gross ton for heavy melting steel. They are now strenuously resisting offers above $13.

Incoming shipments exceed consumption, and distress tonnage is on the verge of becoming a serious factor in this market. To make conditions still more troublesome, one mill is stiffening its inspections on incoming scrap and a few cars have been rejected. Malleable grades are weak because of lack of demand and plentiful supply. Cast iron borings have moved in the week at $9.75 a gross ton. Small users generally look for lower prices. Individual purchases are small and prompt shipment is usually wanted. Demand at electric furnaces is extremely spotty, especially in western Michigan, where some foundries are booked for several months while others are urgently in need of work. A very significant condition in this market is that prices now being paid on railroad lists are off sharply to the lowest level in months.

Prices deliv'd Chicago district consumers.

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$12.75 to	$13.25
Shoveling steel	12.75 to	13.25
Frogs, switches and guards, cut apart, and misc. rails	13.75 to	14.25
Hydraul. compressed sheets	11.50 to	12.00
Drop forge flashings	9.75 to	10.25
No. 1 busheling	10.75 to	11.25
Forg'd cast and r'l'd steel carwheels	15.50 to	16.00
Railroad tires, charg. box size	16.00 to	16.50
Railroad leaf springs cut apart	16.50 to	17.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	14.50 to	15.00
Coil springs	17.00 to	17.50
Electric Furnace Grades:		
Axle turnings	12.00 to	12.50
Low phos. punchings	14.00 to	14.50
Low phos. plates, 12 in. and under	14.00 to	14.50
Blast Furnace Grades:		
Axle turnings	10.50 to	11.00
Cast iron borings	9.25 to	9.75
Short shoveling turnings	9.25 to	9.75
Machine shop turnings	7.25 to	7.75
Rolling Mill Grades:		
Iron rails	14.00 to	14.50
Rerolling rails	15.00 to	15.50
Cupola Grades:		
Steel rails, less than 3 ft	15.25 to	15.75
Steel rails, less than 2 ft	15.75 to	16.25
Angle bars, steel	14.25 to	14.75
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Railroad	16.00 to	16.50
Agricultural	15.00 to	15.50
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angle and splice bars	14.00 to	14.50
Iron arch bars and transoms	15.50 to	16.00
Iron car axles	25.00 to	25.50
Steel car axles	16.00 to	16.50
No. 1 railroad wrought	11.25 to	11.75
No. 2 railroad wrought	11.25 to	11.75
No. 1 busheling	9.00 to	9.50
No. 2 busheling	7.25 to	7.75
Locomotive tires, smooth	14.50 to	15.00
Pipes and flues	8.50 to	9.00
Cupola Grades:		
No. 1 machinery cast	13.25 to	13.75
No. 1 railroad cast	12.75 to	13.25
No. 1 agricultural cast	11.00 to	11.50
Stove plate	10.00 to	10.50
Grate bars	10.25 to	10.75
Brake shoes	10.00 to	10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

NEW YORK

Shapes and Galvanized Sheets Weak—Competition Severe in Pig Iron

NEW YORK, May 6.—Pig iron sales, at 6500 tons, compare with 9000 tons in the previous week and 10,000 tons two weeks ago. The sales volume varies from week to week, but pig iron shipments continue at a relatively even rate and in some instances are reported to be increasing. The Foran Foundry & Mfg. Co., Flemington, N. J., has closed for 1500 tons of eastern Pennsylvania foundry iron. The General Electric Co. is reported to have bought against its inquiry for 450 tons for Bayway, N. J.

Price competition is still severe, with eastern Pennsylvania, Alabama and Northern irons, and occasionally foreign irons, bringing approximately the same delivered prices at various points. Buffalo iron for barge shipment is again a factor; in fact, certain Buffalo producers still have stocks at New Jersey ports laid down last fall. A cargo of 3000 tons of Royal Dutch iron arrived at Bridgeport, Conn., on May 2, and is now being unloaded. No important inquiries are before the trade in this district. A Delaware River cast iron pipe maker is reported to have bought 10,000 tons of iron.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.41
*Buff. No. 2, del'd east. N. J.	19.28 to 19.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.39 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	19.89 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Finished Steel. — Price weakness continues as the dominant characteristic of the New York steel market. Structural shapes have developed a further downward trend. Prices to the average buyer are seldom above 1.80c., Bethlehem, or 1.94½c., New York, but quotations $1 a ton lower are frequently made on desirable tonnages. Weakness in shapes has extended in some degree to plates, especially when sold for construction work. In the main, however, most of the Eastern mills are holding at 1.85c., Coatesville, or 2.02½c., New York, but 1.80c., Coatesville, has appeared on some business. Bar contracts for tonnage buyers have been revised to the basis of 1.75c., Pittsburgh.

Fresh weakness has appeared in galvanized sheets, which are being sold by some producers at 3.15c., Pittsburgh, to jobbers and at 3.20c. to manufacturing consumers. Cold-rolled strip steel is not holding firmly at 2.55c., Pittsburgh or Cleveland, concessions of $1 a ton having been granted on preferential orders.

Although there have been spotty signs of improved business in steel, the general report is that no gains are discernible in tonnage as a whole. Gains in some products are offset by losses elsewhere. The plate market is especially dull.

Mill prices per lb., deliv'd New York: Soft steel bars, $2.09c. to 2.14c.; plates, 2.02½c. to 2.07½c.; structural shapes, 1.89½c. to 1.99½c.

Warehouse Business.—Buying from stock is still light. Prices in some cases lack firmness. Blue annealed sheets are subject to shading of $1 and $2 a ton from the usual quotation of 3.60c. a lb., base, and galvanized sheets, which are quoted at 4.25c. to 4.50c., base, have been offered occasionally at 4.10c. and 4.15c.

Cast Iron Pipe.—Although buying of pressure pipe is limited to small tonnages, prices are being maintained with only occasional concessions. Stone & Webster, Boston, have closed on about 125 tons of 10-in. and 12-in. pipe for Haverhill, Mass. Most of the pipe buying at present is in lots of considerably less than 100 tons.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $39.90 to $40.90; 4-in. and 5-in., $42.90 to $43.90; 3-in., $49.90 to $50.90. Class A and gas pipe, $3 extra.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.60c.
Black sheets (No. 24*)	3.80c. to 4.00c.
Galvanized sheets (No. 24*)	4.25c. to 4.50c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ⅛ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Reinforcing Bars. — Lettings are large, totaling nearly 4000 tons, almost all of it for public work. Two pending local warehouse buildings on which action is expected shortly call for an aggregate of 4400 tons. Price competition is severe.

Concrete bars in 40, 50 and 60-ft. lengths for mill shipment are quoted at 1.75c. a lb., base, Pittsburgh. Warehouse prices range from 2.44c. a lb., f.o.b. cars New York, for carloads or larger lots to 3.25c. for the smallest tonnages.

Coke. — Standard furnace coke prices show steadiness despite lack of substantial buying, and quotations continue at $2.50 to $2.60 a net ton, Connellsville, with certain operations asking $2.75. Foundry coke is quoted as follows:

Special brands of beehive foundry coke, $4.85 a net ton, ovens, or $8.56 delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn; by-product foundry coke, $9 to $9.40, Newark or Jersey City; $10.06, New York or Brooklyn.

Old Material.—No. 1 heavy melting steel is being bought by brokers at $9.50 to $10 a ton, New York, for shipment to eastern Pennsylvania, and at $11 on barges for delivery to Buffalo. All grades of scrap lack strength in a quiet market.

Dealers buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$9.50 to $11.00
Heavy melting steel (yard)	7.00 to 7.25
No. 1 hvy. breakable cast	8.75 to 9.75
Stove plate (steel works)	7.00 to 7.50
Locomotive grate bars	7.00 to 7.50
Machine shop turnings	6.50 to 7.00
Short shoveling turnings	7.00 to 7.25
Cast borings (blast fur. or steel works)	6.50
Mixed borings and turnings	6.00 to 6.25
Steel car axles	17.00
Iron car axles	20.00 to 20.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.25
Forge fire	8.50
No. 1 railroad wrought	11.25
No. 1 yard wrought, long	10.25
Rails for rolling	10.25 to 10.75
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	11.50 to 12.00
Cast borings (chemical)	9.00 to 9.50
Prices per gross ton, deliv'd local foundries:	
No. 1 machry. cast	$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size	13.00
No. 2 cast (radiators, cast boilers, etc.)	12.50

Charles Dreifus & Co. have discontinued their Boston office at 845 Park Square building. Joseph D. Bardon was the Boston representative.

The Southern New England chapter of the Institute of Scrap Iron and Steel, Inc., has voted to merge with the New York chapter.

Chicago Bridge & Iron Works has moved its Atlanta, Ga., office to the Rhodes-Haverty Building. R. M. Campbell is in charge.

PHILADELPHIA

Steel Prices Lack Firmness—Consumer Operations Vary

PHILADELPHIA, May 6.—Although steel mill operations are being generally maintained at about 65 per cent of rated capacity, mill stocks are in certain cases increasing and price concessions are not uncommon, with producers seeking sufficient tonnage to continue to operate at the present level. Sheet prices lack firmness. While plates are maintained at 1.85c., Coatesville, concessions of $1 a ton continue on combined orders of universal plates and structural shapes.

Operating rates of eastern Pennsylvania consumers of steel vary considerably. Some manufacturers in the automobile field are maintaining only about 40 per cent operation, while one automobile body builder executing a contract with the Ford Motor Co. is maintaining a high operating schedule and used more sheets in April than in March. The Baldwin Locomotive Works reports more shipments in April than in the entire first four months of 1929.

Pig Iron.—Eastern Pennsylvania furnaces continue to quote foundry iron at $19.50, furnace, and concessions are not common, although it is suggested that this price would be shaded slightly on a substantial tonnage. Birmingham furnaces are quoting down to $12.50 a ton for medium-sized tonnages of foundry iron and on a large lot for a cast iron pipe manufacturer in this district offered $12, Birmingham. The Baldwin Locomotive Works has closed on about 1500 tons of cylinder iron, and the order is reported to have gone to a Southern furnace. The General Steel Castings Co., Eddystone, Pa., which recently inquired for 200 tons of low phosphorus iron and 500 tons of basic, has closed on the low phosphorus with a nearby furnace and has increased its basic requirements to 2000 tons. The Lusey & Jones Co., Wilmington, Del., has closed on about 300 tons of off-grade Birmingham iron for ship ballast.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X	21.26
Basic (del'd east. Pa.)	$18.75 to 19.00
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Buying is limited to lots of considerably less than a carload, on which 1.80c., Pittsburgh, or 2.12c., Philadelphia, is usually quoted. On more substantial orders, concessions of $1 a ton would not be unlikely.

Shapes.—Quotations continue at 1.75c. to 1.80c. a lb., f.o.b. nearest mill to consumer, or 1.81c. to 1.86c., delivered Philadelphia. Mills are operating at about 65 per cent, but some material is going into stock. Fabricating shops are quoting on a number of small tonnage projects, but there is a lack of large business. A building for Temple University calls for 500 tons of structural shapes, and bids are being submitted on a number of small bridges for the State Highway Commission and the Pennsylvania Railroad.

Plates.—Tank and boiler makers are the most active plate consumers at present, with the railroads quiet. Ship contracts, on which bids have been taken, await Government approval. The price of sheared plates is 1.85c. a lb., Coatesville, Pa., or 1.95c., delivered Philadelphia, but 1.80c., Coatesville, Pa., or 1.90c., Philadelphia, has been quoted on combined orders of universal plates and structural shapes.

Sheets.—Prices of sheets lack firmness, with mills in need of tonnage and buyers limiting purchases to small lots. Black sheets have settled to 2.55c. a lb., Pittsburgh, or 2.87c., delivered Philadelphia, and galvanized range from 3.25c. to 3.30c., Pittsburgh, or 3.57c. to 3.62c., delivered Philadelphia. Blue annealed sheets are quoted at 2.15c. to 2.25c., Pittsburgh, or 2.47c. to 2.57c., delivered Philadelphia, for No. 13 gage and blue annealed plates are 2c. to 2.10c., Pittsburgh, or 2.32c. to 2.42c., delivered Philadelphia. The minimum quotation is usually made to preferred buyers, even on small lots, or when competition is encountered from the product of the continuous mill.

Warehouse Business.—Purchases of steel from stock in April compared favorably with those of March, but the total of business is considerably smaller than usual at this season. Galvanized sheets, which have shown slight weakness recently, have been reduced by warehouses in this district 20c. a 100 lb. to 4.25c. a lb., base.

Imports.—In the week ended May 3, 5330 tons of iron ore arrived at this port from Algeria and 2407 tons of pig iron from British India.

Old Material.—Transactions in scrap are limited to small tonnages, and prices show a continued downward trend. Machine shop turnings are off 50c. a ton, following purchase of a small tonnage by an eastern Pennsylvania consumer at $10 a ton, delivered. Other grades are so inactive that it is difficult to determine the actual market price.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $13.75
No. 2 heavy melting steel	11.00 to 11.50
Heavy melting steel (yard)	10.50 to 11.00
No. 1 railroad wrought	15.00 to 15.50
Bundled sheets (for steel works)	10.50 to 11.00
Hydraulic compressed, new	12.50 to 12.75
Hydraulic compressed, old	11.00
Machine shop turnings (for steel works)	10.00
Heavy axle turnings (or equiv.)	12.00 to 12.50
Cast borings (for steel works and roll. mill)	10.50
Heavy breakable cast (for steel works)	13.00
Railroad grate bars	10.50
Stove plate (for steel works)	10.50
No. 1 low phos., hvy., 0.04% and under	20.00 to 20.50
Couplers and knuckles	19.50 to 20.00
Rolled steel wheels	19.00 to 19.50
No. 1 blast f'nace scrap	10.00 to 10.50
Wrot. iron and soft steel pipes and tubes (new specific.)	13.50
Shafting	18.00 to 18.50
Steel axles	21.00 to 21.50
No. 1 forge fire	12.50 to 13.00
Cast iron carwheels	15.00
No. 1 cast	14.00 to 14.50
Cast borings (for chem. plant)	13.50 to 14.00
Steel rails for rolling	15.00 to 15.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ¼-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.80c.
Cold-fin., steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.55c.
Steel bands, No. 12 to ¼-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.80c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates, ¼-in.	5.30c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

The Hill Clutch Machine & Foundry Co., Breakwater Avenue, Cleveland, has reopened its New York office. A. L. Whiteside, the engineer in charge, has been in the main plant at Cleveland for several years. He has also been actively connected with the development of the new "Hill tubular" agitator, a device applicable to liquid and semi-fluid mixtures, and has first-hand knowledge of both transmission and agitation problems. The company, which also manufactures large and medium gray iron and semi-steel castings and special machinery, is stated to be one of the oldest firms in Cleveland, having been founded on its present site in 1886.

CLEVELAND

Few Signs of Improvement—Ingot Rate Down to 70 Per Cent

CLEVELAND, May 6.—The demand for finished steel showed virtually no change during the past week. Consuming industries as a rule are maintaining their recent rate of operations, but there are few signs of improvement. The automotive industry is expected to make a somewhat better showing this month than in April, but, aside from increase in production schedules by the Ford and Chevrolet companies, this month has started with little change in operations by leading motor car companies. Conditions are spotty with makers of automobile parts, those that are doing Ford and Chevrolet work being about the only ones that are operating around capacity.

Local steel plant operations were again curtailed this week with the shutting down of four open-hearth furnaces. Cleveland plants are now operating at 70 per cent of ingot capacity, as compared with 82 per cent last week. Sheet mills are maintaining their recent operations, but have little backlog tonnage.

Prices on most products are fairly well stabilized at recent levels within a range of $2 a ton. Wire rods have been reduced $2 a ton and wire products have been marked down to bring quotations more in line with prices that have prevailed recently. Pig iron has been reduced 50c. a ton in Cleveland for local delivery.

Pig Iron.—Cleveland furnaces May 5 reduced prices 50c. a ton to $18.50 on foundry and malleable iron for local delivery. This is the first local price change since November, 1928. While the price for outside shipment is still nominally $18.50, this has been shaded recently to $18. With the competitive situation that exists, local furnaces are no longer making much effort to maintain a uniform outside price for many consuming points, their price being determined by the competitive conditions at the point of delivery. Sales continue light. Consumers are buying only for early needs and orders on the average are only for 30 days' requirements.

Prices in sections in which Chicago iron competes with iron from other Lake furnaces do not appear to have been affected by the recent reduction in the Chicago price. Foundry and malleable iron are quoted at $19 in western Michigan, $19.50 in the eastern part of the State and from $18.50 to $19 in northern Indiana. Shipping orders show little change from last month. While some of the automobile foundries are taking a little more iron than they were, shipments to some of the manufacturers of heating equipment have declined somewhat.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$18.50
S'th'n fdy., sil. 1.75 to 2.25	19.51
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	$26.50 to 27.00

Prices are f.o.b. furnace except on southern foundry and silvery iron. Freight rates: 50c. average local switching charge; $3 from Jackson, Ohio; $6.01 from Birmingham.

Iron Ore.—Water shipments during April amounted to only 107,559 tons, as compared with 2,516,241 tons during April last year. While quite a few vessels have gone into commission in the ore trade since May 1, there is no expectation that the movement this month will be very heavy.

Semi-Finished Steel.—Wire rods have been reduced $2 a ton to $36, Cleveland and Pittsburgh. Sheet bars, billets and slabs are unchanged at $33, Cleveland and Youngstown. While there is no new business, shipments are being made against contracts at that price. Shipping orders have declined, and the local merchant producer has taken off three additional open-hearth furnaces, now operating eight of 14.

Bars, Plates and Shapes.—Orders for these products are only in moderate volume and are mostly for small lots. Demand for steel bars with some mills is lighter than recently. Not much new inquiry is coming out for structural material in the building field, although there is still a good demand for small lots for highway bridge work. The Manitowoc Shipbuilding Co. has taken an order from the Grand Trunk Railroad for a car ferry requiring 2500 tons of plates, which probably will be supplied by a Chicago district mill.

Plates and shapes are unchanged at 1.75c. to 1.80c., Pittsburgh, most of the business going at the higher price. There appears to be no deviation from the 1.80c., Cleveland, price on steel bars.

Sheets.—Demand for sheets holds to recent moderate volume. A number of fair-sized lots were placed with several mills during the week by a local automobile body plant that makes stampings for Chevrolet car bodies. This plant is now operating on a basis of 20,000 or more bodies per week. Consuming industries in other fields are not busy enough to take up any slack in the demand from the motor car industry.

While prices are still irregular, little change developed during the week. Black sheets are rather commonly quoted at 2.55c., Pittsburgh. Auto body sheets are firm, but occasional shading to 3.80c. is reported on furniture sheets. Galvanized sheets are occasionally shaded $1 a ton from the 3.30c. price.

Reinforcing Bars.—The Hunkin-Conkey Construction Co. has been awarded the general contract for the Fulton Road bridge, Cleveland, requiring 1400 tons. Ohio will require unstated tonnages for the Cleveland Hawthorn Farms Hospital buildings. Small lots are in fair demand. Rail steel bars are commonly quoted at 1.75c. to 1.80c., mill.

Wire Products.—Manufacturers have formally reduced prices $2 a ton, bringing regular quotations closely in line with prices that have been prevailing rather commonly recently. Nails are now $2.15 per keg to jobbers, and manufacturers' wire is 2.30c. Woven wire fence is unchanged. Business in all wire products is quiet. Demand for manufacturers' wire from the bolt and nut industry is slow.

Strip Steel.—Hot-rolled strip is still in fair demand. Although 1.70c., Pittsburgh, for wide and 1.80c. for narrow strip are quite commonly quoted, mills are still able to get $2 a ton higher for car lots. Cold-rolled strip is very quiet, and the price is well maintained at 2.55c., Cleveland. Aside from the recent shading to 3.80c. on an inquiry for a large lot of fender stock, there seems to be no deviation from the 3.90c. price for this material and a good-sized order was taken at that price during the week.

Old Material.—With no new consumer demand, the scrap market continues very quiet. Detroit dealers have started to make shipments by water to Cleveland to apply on contracts taken last fall, shipments against which were held up. Demand for borings and turnings has been curtailed because some of the larger consumers in the Ohio territory are using little scrap in their blast furnaces.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$13.25 to $13.75
No. 2 heavy melting steel	12.75 to 13.25
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.00 to 11.50
Drop forge flashings	11.00 to 11.50
Machine shop turnings	9.00 to 9.50
Short shoveling turnings	10.50 to 11.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	12.00 to 12.50
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.00 to 10.25
Mixed borings and short turnings	10.00 to 10.25
No. 2 busheling	9.25 to 9.50
Cupola Grades:	
No. 1 cast	15.00 to 15.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50
Miscellaneous:	
Rails for rolling	16.25 to 16.50
Railroad malleable	16.00 to 16.50

BIRMINGHAM

Steel Demand Diminishing—Pig Iron Melt Is Lower

BIRMINGHAM, May 6.—Pig iron sales in the week to those who buy as needed were about the same as in the two preceding weeks. Sales to outside territories in the past 10 days have contributed several round tonnages, though shipments to the same districts as a whole have shown a marked decline. The district melt pig iron is not quite so heavy as three or four weeks ago. Pressure pipe shops are the only consumers whose melt has held its own. Stove plants and general foundries are melting less. District prices are firm and unchanged at $14, but in some of the other territories concessions of $1.50 to $2 are reported. The total of active furnaces remains at 17. Of this number, nine are on foundry, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.00
No. 1 fdy., 2.25 to 2.75 sil.	14.50
Basic	14.00

Finished Steel.—It is a struggle for new business to hold the rate set in April, and more effort is required to maintain order books in several lines. Operations are unchanged, but in some lines a portion of the output is being stocked. This is true of wire products, sheets and some of the lighter lines. Tank business is declining. Mills experience no trouble in moving the steel after orders are booked. In fact, consumers often desire earlier delivery than can be had, though on the whole early deliveries are easier to obtain now than at any time since February. Light demand from the building trade has turned structural steel fabricators to concentrate more on bridge and miscellaneous work that runs in small jobs. The Ingalls Iron Works Co. has booked an order for 1000 tons for the Virginia Public Service Co. at Bremo, Va. The recent increase in reinforcing bar business has apparently reached a peak for the time being, though it is still below normal for this season.

Cast Iron Pipe.—The United States Pipe & Foundry Co. and the American Cast Iron Pipe Co. shared in the 4000-ton project recently awarded by Detroit. The National Cast Iron Pipe Co. has received an order from the Southern Natural Gas Co. for seven miles of small-size pipe for a distribution system at Leeds, Ala. Other projects of this nature are in course of development. London, Tenn., will open bids May 21, for 24,420 ft. of 6-in. pipe. Bids will be opened May 7, on 2772 ft. of 8-in. pipe and 5800 ft. of 6-in. pipe for Livingston, Ala. Plant operations remain on a schedule for five days a week in nearly all instances. Prices continue at $37 to $38 a ton, Birmingham, for 6-in. and larger sizes.

Old Material.—Shipping orders of the large steel mills have been at a fair rate during the past two or three weeks. Quotations are nominally unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	2.45c. to 2.95c.
Soft steel bars	2.40c. to 2.95c.
Black sheets (No. 24)	3.65c. to 4.30c.
Blue ann'l'd sheets (No. 10)	3.05c. to 3.55c.
Galv. sheets (No. 24)	4.30c. to 4.80c.
Struc. rivets, ½-in. and larger	5.55c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

PACIFIC COAST

Structural Steel Demand More Active—Market Feature

SAN FRANCISCO, May 3. (*By Air Mail*).—Building construction activity is considerably below that of the same time last year. However, structural steel demand was the most active feature of steel trade in the past week. The largest award was 475 tons for sound stages for the Fox West Coast theaters at Fox Hills, Cal., taken by the Consolidation Steel Corporation.

In plates, there were two awards of fair size. The Pacific Coast Engineering Co. bought 150 tons for 20-in. welded steel shore pipe for the Port Commission, Oakland, and Everett, Wash., placed the general contract for 375 tons for a 30-in. welded steel pipe line with J. W. Hoover.

The chief inquiry for reinforcing bars involves 900 tons for approaches to the Lake Union bridge at Seattle.

Plates are now generally quoted at 2.20c., c. i. f. Structural shapes and bars remain steady at 2.35c., c. i. f. Los Angeles out-of-stock prices on bars continue at 2.40c., base, in carload lots, with San Francisco quotations $2 a ton lower.

Pig Iron.—The market situation is unchanged. Melters continue to buy small lots only for nearby needs. Prices are steady.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Cast Iron Pipe.—The only cast iron pipe award of the week went to the National Cast Iron Pipe Co. and involved 536 tons of 16 and 18-in. for Los Angeles. Bellingham, Wash., has opened bids on 278 tons of 4 to 12-in. pipe. Bids have been opened on 309 tons of 6 and 8-in. for San Francisco. No new inquiries of importance have developed.

Canada

Structural Steel Pending Totals 100,000 Tons

TORONTO, ONT., May 6.—A few pig iron contracts were closed during the week for delivery to the end of June, but forward buying is comparatively dull. Only a small number of melters have yet to cover for this quarter's needs. Spot demand is well sustained, and in some respects improving. The bulk of such business is coming from small consumers. Prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	22.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel—The prospective demand for structural steel continues large, with pending orders said to total more than 100,000 tons. The announced tariff changes are expected to result in larger production of structural shapes in this country, although it is too early to make definite prediction as mill officials themselves have made no decision.

Old Material—While no large orders were booked during the week, small spot sales were fairly good. Some improvement in steel scrap buying by mill consumers has developed. Larger shipments on old contracts are also being made to Hamilton, Toronto and Montreal consumers. The demand for iron scrap is growing steadily. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	11.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	6.50
Heavy axle turnings	7.50	6.50
Cast borings	6.50	5.00
Steel borings	6.50	6.00
Wrought pipe	6.00	6.00
Steel axles	14.00	17.00
Axles, wrought iron	16.00	19.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$15.00	....
Stove plate	11.00	....
Standard carwheels	14.00	....
Malleable scrap	11.00	....

CINCINNATI

Pig Iron Sales Increase Slightly—Sheet Operations 50 to 60 Per Cent

CINCINNATI, May 6.—Pig iron sales increased slightly over the preceding week as consumers bought to cover their nearby needs. District furnace representatives accounted for approximately 3150 tons, of which about 300 tons in small lots was Southern iron. Foundries continue to curtail operations. Northern iron is firm at about 18.50 base, Lake furnace, and Southern iron is weak at $13, base Birmingham. A Michigan buyer took 300 tons of Northern foundry iron, and another bought 300 tons of silvery. A southern Ohio buyer purchased 300 tons of Northern foundry iron, and a central Ohio melter contracted for 250 tons. A southern Ohio consumer is inquiring for 3000 tons of Northern foundry and a western Ohio consumer is in the market for 200 tons. A third inquiry from central Ohio for 150 tons completes the pending business.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	16.69 to 17.69
Ala. fdy., sil. 2.25 to 2.75	17.19 to 18.19
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 17.69
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Steel—The leading sheet interest reports that production is fluctuating between 50 and 60 per cent of capacity in conformity with the current demand. No backlog is being built up. Virtually all orders are for rush shipment.

Old Material—Mills have curtailed shipments against old commitments, and very little new business is being closed. Prices, while not changed in the last week, are still weak, causing a "freezing" of some sources of supply. The Norfolk & Western Railroad is offering its usual list.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.30c.
Rail steel reinforc. bars	3.15c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg (25 kegs or more)	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb	10.25
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$11.50 to $12.00
Scrap rails for melting	13.00 to 13.50
Loose sheet clippings	8.00 to 8.50
Bundled sheets	10.75 to 11.25
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.75 to 8.25
No. 1 busheling	9.75 to 10.25
No. 2 busheling	6.25 to 6.75
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	14.00 to 14.50
No. 2 railroad wrought	11.50 to 12.00
Short rails	17.75 to 18.25
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	9.25 to 9.75
Stove plate	9.25 to 9.75
Brake shoes	9.25 to 9.75
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Old Material.—Scrap business here has dwindled to the lowest level since early in 1929. With Pennsylvania steel mills holding up shipments of pipe, No. 1 heavy melting steel, steel turnings and mixed borings and turnings, and with a Worcester, Mass., mill out of the market for scrap and considering shutting down one furnace, the outlook is not bright. Most of the heavy melting steel sold the past week was at $9 to $9.25 a ton, on cars shipping point, but in at least one case $8.75 was done. Average prices paid for all kinds of mill borings were $5 to $5.10, and for shafting $12.50 to $13. Chemical borings are scarce and prices for them are holding. Some weakness has appeared in No. 1 machinery cast.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.75 to $9.25
Scrap T rails	9.00 to 9.25
Scrap girder rails	8.00 to 8.25
No. 1 railroad wrought	9.50 to 10.00
Machine shop turnings	5.00 to 5.50
Cast iron borings (steel works and rolling mill)	5.00 to 5.50
Bundled skeleton, long	8.00 to 8.25
Forge flashings	8.00 to 8.25
Blast furnace borings and turnings	5.00 to 5.10
Forge scrap	7.00 to 8.00
Shafting	12.50 to 13.50
Steel car axles	15.50 to 16.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	8.00 to 8.50
Rails for rolling	9.50 to 10.00
Cast iron borings, chemical	9.00 to 9.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$12.00 to $13.00
No. 1 machinery cast	14.50 to 15.00
No. 2 machinery cast	13.50 to 14.00
Stove plate	10.00 to 10.50
Railroad malleable	16.00 to 16.50

Reinforcing Bars.—With the mill price on billet steel bars now openly 1.75c. to 1.80c. a lb., base, mill, sellers from local stock are still holding to be in the market for supplies later this month.

BOSTON

Pig Iron and Scrap Buying at Low Level—Cast Iron Pipe Prices Lower

BOSTON, May 6.—Business in pig iron continues dull, and in the past week did not aggregate more than 2000 tons. A Vermont foundry feeling out the market for 500 tons of No. 2X is reported to have been offered Eastern iron at $21 a ton, delivered, but has not closed as yet. The same melter has intimated it will be in the market next month for third quarter iron. A Connecticut malleable iron consumer will, it is reported, soon send out inquiries for a sizable tonnage. Otherwise, there is little prospective business in sight.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$20.28 to $21.28
†Buffalo, sil. 2.25 to 2.75	20.78 to 21.78
*Buffalo, sil. 1.75 to 2.25	20.91 to 21.91
*Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	22.61
*Ala., sil. 2.25 to 2.75	23.11
†Ala., sil. 1.75 to 2.25	18.76
†Ala., sil. 2.25 to 2.75	19.26

Freight rates: $4.91 all rail and $4.28 rail and water from Buffalo; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Cast Iron Pipe.—Pipe prices are decidedly unsettled owing to cutting by two foundries. In some cases prices made the past week on 6-in. pipe and larger were $3 to $4 a ton, under the $37 to $38 a ton f.o.b. foundry quoted on 6-in. fortnight ago. A common price is $36 a ton, f.o.b. foundry. The United States Pipe & Foundry Co. was awarded 4000 tons by Hanover, Mass. Middletown, Conn., has awarded 700 tons of 16-in. pipe to R. D. Wood & Co.; Palmer, Mass., 400 tons of 6 to 16-in. to R. D. Wood & Co.; Peabody, Mass., 300 tons of 6 to 12-in. to the United States Pipe & Foundry Co.; and Stone & Webster, Inc., 190 tons of 10 and 12-in. gas pipe for a Haverhill, Mass., plant to the Warren Foundry & Pipe Co.

Beverly, Mass., will close bids this week on 100 tons of pipe, and Wellesley, Mass., Leominster, Mass., and Augusta, Me., will place tonnages. Southboro, Brookfield, Mansfield, Marshfield, and Braintree, all in Massachusetts, according to report, will

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring Steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

3.06½c. a lb., base, for 1 to 5-ton lots, but on larger lots have dropped prices all of $2 a ton, 5 to 99 ton lots now being 2.56½c., and 100-ton and larger lots, 2.46½c. The Concrete Steel Co. has been awarded 250 tons for a Worcester, Mass., job, the largest letting of the past week. No large tonnages of rail steel bars were reported sold the past week. The market for such material is 2.26½c. a lb., base, delivered Boston freight rate points.

Youngstown

Valley Mill Operations Average Seventy Per Cent

YOUNGSTOWN, May 6.—This week the iron and steel industry of the Youngstown district continues to function at a 70 per cent average, with some improvement in the requirements for flat-rolled steel for the automobile industry. Fabricators in the Mahoning and Shenango Valleys are enlarging their steel orders and expanding production, affording a steady outlet for products of the mills. Of 120 Valley sheet mills, 95 are scheduled.

The pipe mill of the Republic Steel Corporation, producing tubing by the electrical welding process, is booked for two months, rolling principally 4-in. and 6-in. pipe, to be used as feeder lines for various gas line projects. The company is installing another mill, designed to roll pipe up to 16 in. diameter, which it was expected to start in May. However, delays in the delivery of machinery will hold up the completion and operation of this mill.

The Youngstown Sheet & Tube Co. continues to operate at 65 per cent; the Republic Steel Corporation at 70 per cent; Carnegie Steel Co. district properties at 65 to 70 per cent; Sharon Steel Hoop Co., 85 per cent, and the Newton Steel Co., 70 per cent.

This week's schedules show a decline of two in the number of active open-hearth furnaces in the Valley.

Joseph Schonthal Co., Columbus, Ohio, which is headed by the president of the Institute of Iron and Steel Scrap, Inc., will open an office in Pittsburgh on May 5, with Max Meltzer in charge. Space has been taken in the Grant Building. Mr. Meltzer has been in charge of the company's Detroit branch, which he will supervise from his new location.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.20
Black wire, base per 100 lb.	3.50

ST. LOUIS

Pig Iron Reduced 50c. a Ton—Steel Buying Only Fair—Scrap Lower

ST. LOUIS, May 6.—The local maker has reduced its price to $19 f.o.b. Granite City, a drop of 50c. a ton, and the price of Southern iron has been cut to $13, Birmingham. The St. Louis Gas & Coke Corporation sold about 1500 tons in scattered lots, while Southern makers' sales were virtually nothing. Not much buying is expected during May and June, melters being well supplied with iron, and it is likely that some melters have purchased a sufficient tonnage to run into the third quarter.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
Malleable, f.o.b. Granite City	19.00
N'th'n No. 2 fdy., deliv'd St. Louis	21.16
Southern No. 2 fdy., deliv'd	17.42
Northern malleable, deliv'd	21.16
Northern basic, deliv'd	21.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel—Business in plates, shapes, bars and sheets was only fair during the last week. Warehouse business for April was about on a par with March, while the April volume was from 15 to 20 per cent less than that of the same month last year. Conditions in the oil fields are still quiet. The only reinforcing bar award of the week was 900 tons for a grain elevator at St. Louis for the Missouri Pacific Railroad.

Old Material—The scrap market is extremely dull, and prices are lower again this week. Consumers in the district say they have not sufficient business booked to warrant further purchases. Railroads are rushing deliveries of scrap they have sold. Shipments from country dealers are light because of low prices. There is said to be no distress material, and dealers have not found it necessary to pile up scrap in their yards. Railroad lists: Pennsylvania, 44,405 tons; Baltimore & Ohio, 13,100 tons; Missouri Pacific, 160 carloads; Chicago, Rock Island & Pacific, 100 carloads; Mobile & Ohio, 13 carloads; Chicago Belt Line, 12 carloads.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	$12.00 to $12.50
No. 1 heavy melting or shoveling steel	11.50 to 12.00
No. 2 heavy melting or shoveling steel	10.75 to 11.25
No. 1 locomotive tires	14.00 to 14.50
Misc. stand-sec. rails including frogs, switches and guards, cut apart	12.00 to 12.50
Railroad springs	14.25 to 14.75
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	11.00 to 11.50
Rails for rolling	12.50 to 13.00
Machine shop turnings	6.75 to 7.25
Heavy turnings	9.00 to 9.50
Steel car axles	16.50 to 17.00
Iron car axles	25.50 to 26.00
Wrot. iron bars and trans.	18.00 to 18.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	14.50 to 15.00
Steel angle bars	12.00 to 12.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	13.50 to 14.00
Railroad malleable	13.25 to 13.75
No. 1 railroad cast	11.50 to 12.00
Stove plate	10.00 to 10.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails 70 lb. and over	26.50 to 29.00
Agricult. malleable	12.50 to 13.00

BUFFALO

Pig Iron Sales Less Than 5000 Tons—Steel Mill Operations Unchanged

BUFFALO, May 6.—The pig-iron market has been very quiet in the past week. Total sales are estimated at less than 5000 tons. The largest open inquiry is for 300 tons of foundry. The Lackawanna plant of the Bethlehem Steel Co. has reduced its furnaces in blast from five to four.

Prices per gross ton f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$18.50
No. 2X fdy., sil. 2.25 to 2.75	19.00
No. 1 fdy., sil. 2.75 to 3.25	20.00
Malleable, sil. up to 2.25	19.00
Basic	17.50
Lake Superior charcoal	27.28

Finished Steel.—Operation of steel mills in this district are about the same as last week, with little prospect of gains in the near future.

Reinforcing bar makers are interested in State road jobs involving about 300 tons of bars. The principal one is a road at Weedsport, which will require 200 tons of wire mesh.

Old Material.—Activity is at a minimum, and prices generally are softer. It is understood that dealers who took their last order for heavy melting steel at $15.25 are buying readily against this commitment at $14.25. Other dealers here with $14 orders for No. 1 heavy melting steel are buying freely at $13.50. Only one mill in the district is receiving shipments, two of the other large consumers having suspended them for

the past week. Hydraulic compressed sheet shipments by boat are coming in at the rate of about two boatloads every 10 days.

Prices per gross ton f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$13.75 to $14.75
No. 2 heavy melting scrap	12.25
Scrap rails	14.00 to 15.00
Hydraul. comp. sheets	12.25
Hand bundled sheets	10.00 to 10.50
Drop forge flashings	12.25
No. 1 busheling	13.75
Hvy. steel axle turnings	13.00 to 13.50
Machine shop turnings	8.00 to 9.00
No. 1 railroad wrought	10.50 to 11.00
Acid Open-Hearth Grades:	
Knuckles and couplers	16.50 to 17.00
Coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phos. billet and bloom ends	17.50 to 18.00
Electric Furnace Grades:	
Short shov. steel turnings	11.50 to 11.75
Blast Furnace Grades:	
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
No. 2 busheling	8.00
Rolling Mill Grades:	
Steel car axles	16.50 to 17.00
Iron axles	19.50 to 20.00
Cupola Grades:	
No. 1 machinery cast	12.50 to 13.00
Stove plate	11.50 to 12.00
Locomotive grate bars	10.00 to 10.50
Steel rails, 3 ft. and under	16.50 to 17.00
Cast iron carwheels	11.50 to 12.00
Malleable Grades:	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50
Special Grades:	
Chemical borings	11.50 to 12.00

Heavy Melting Scrap Lower at Detroit

DETROIT, May 6.—One of the Lake mills has released boat shipments of scrap, which should serve as a brake on the declining market. Heavy melting and shoveling steel declined 25c. a ton.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$11.25 to $11.75
Borings and short turnings	8.00 to 8.50
Long turnings	7.00 to 7.50
No. 1 machinery cast	11.25 to 11.75
Automotive cast	13.50 to 14.00
Hydraul. comp. sheets	11.25 to 11.75
Stove plate	9.00 to 9.50
New No. 1 busheling	10.25 to 10.75
Old No. 1 busheling	8.75 to 9.25
Sheet clippings	8.25 to 8.75
Flashings	10.00 to 10.50

Chicago to Object to Switching Rate Rise

The city of Chicago expects to file an objection to an increase in freight rates within the Chicago switching district, a matter which is to be considered later this year by the Interstate Commerce Commission. Objection is being raised on the point that an increase in switching rates would mean that the bulk of the railroad freight would be shifted to trucks, which would greatly aggravate the street traffic problem in the city.

Soo Canal Opened

The first ore boat to pass through the Soo Canal this season arrived at Conneaut, Ohio, April 27.

DETROIT

April Motor Car Output Upward of 500,000 Units

DETROIT, May 6.—The volume of steel buying by the automobile industry is still disappointing to the steel trade, though a few large releases in the past few days are regarded as possible forerunner of larger requirements this month.

The Ford Motor Co. is reported to be turning out 9000 cars a day, with a possibility that it may reach 9700 within the next few weeks. The Ford company is now manufacturing close to half of the total output of automobiles.

The Fisher Body Corporation, which makes all of the bodies for Chevrolet cars, was on a schedule last week of 22,000 against 12,000 the previous week. It is reported that the schedule of 22,000 is being continued this week.

The Studebaker Corporation is planning its steel purchases on the basis of an estimated output of 73,000 cars in 1930, against nearly double that number last year.

April automobile production is estimated at somewhat more than 500,000 cars, compared with 422,000 in March and 621,000 in April, 1929. Indications are that May output may be slightly higher, although this depends to a large extent on what Ford and Chevrolet do, since they are turning out from 65 to 70 per cent of all of the automobiles now being made.

April production figures are reported here as follows: Chevrolet, 95,500 as against 106,000 in March and 120,000 in April, 1929; Ford, 178,500 as against 162,250 in March and 166,800 in April, last year; Hudson-Essex, 14,250, against 22,700 in March and 41,800 in April, last year; Chrysler-Plymouth, 16,729, against 13,246 in March and 21,530 in April, last year; Dodge, 11,285, against 15,088 in March and 22,249 in April, last year; Studebaker, 5750, against 8175 in March and 12,000 in April, last year.

Wire Products Reduced $2 to $3 a Ton

Effective May 2, the American Steel & Wire Co. reduced prices on wire rods and miscellaneous wire products $2 to $3 a ton and also reduced the differential from $3 to $2 a ton at Worcester, Mass., over Pittsburgh. The company's announcement follows:

"To conform with trade paper quotations, which represent prices being generally made by other manufacturers, the American Steel & Wire Co. have today revised their selling prices as follows: Wire rods, $36 per ton; wire nails $2.15, base; plain wire, $2.30, base, all f.o.b. Pittsburgh and Cleveland, with $1 per ton higher f.o.b. Chicago; plain wire $2 per ton higher f.o.b. Worcester.

"These prices represent a reduction of about $2 to $3 per ton from the American Steel & Wire Co. schedule, which they have been maintaining. The general market having settled down to a lower basis, the above revision more nearly approximates market prices now current."

Pig Iron Imports Gain in March; Lower in Quarter

Imports of pig iron in March, at 12,182 gross tons, showed a gain of nearly 39 per cent over the February total of 8900 tons, and were still further above the arrivals of March, 1929, at 8572 tons. For the first quarter, however, the total is more than 25 per cent below that of last year.

British India furnished upward of 70 per cent of the March imports, going up in quantity, but falling in percentage as compared with February. This is in contrast with last year, when Indian pig iron received in March was lower than that from United Kingdom or Netherlands, and constituted less than one-seventh of the total arrivals.

For the quarter, Indian iron represents 73 per cent of all incoming tonnage, against only 38 per cent last year. British tonnage has dropped more than two-thirds, compared with last year, and that from the Netherlands is only about one-seventh as great as in the first quarter of 1929.

Total imports in March were the largest of the year, but were about 5000 tons below the incoming tonnage last December.

Scanty Ore Shipments

Ore shipments from upper Lake ports in April are reported by the Lake Superior Iron Ore Association at 107,559 gross tons, a sharp decline from the 2,516,241 tons shipped in April, 1929. Three of the six ports made no shipments, these three accounting for about half the tonnage of April, 1929.

Expansion by Canadian Steel Corporation

The Canadian Steel Corporation, Ltd., Ojibway, Ont., will expend $2,000,000 this year on the construction of two coating plants, one for coating tin plate and the other for galvanizing sheets. The black plate and black sheets will be shipped to Ojibway from the United States.

$7,000,000 Paid for Sheet & Tube Stock

This Amount Purchased by Pickands, Mather & Co., Testimony Given at Youngstown Reveals

YOUNGSTOWN, May 5. — Attorneys for Cyrus S. Eaton, Cleveland, are continuing their fight against the merger of the Youngstown Sheet & Tube Co. with the Bethlehem Steel Corporation and have been taking depositions at Youngstown and Cleveland from officials of the Sheet & Tube company and Pickands, Mather & Co., Cleveland. Harry M. Crawford, of Squire, Sanders & Dempsey, Cleveland law firm, handling the matter for the Eaton-Otis-Wick group, states that he intends to take an Eastern trip during the week of May 12 with the intention of taking depositions, if possible, from Eugene G. Grace, president, and Charles M. Schwab, chairman, of the Bethlehem company.

Additional depositions were taken in the past week, and among those who have been questioned are W. J. Morris, vice-president in charge of finances, of the Sheet & Tube company; Walter E. Meub, secretary-treasurer of Sheet & Tube; John Tod, Youngstown, a director and member of the Sheet & Tube advisory committee; Elton Hoyt, II, a partner in Pickands, Mather & Co.; J. B. Kennedy, Poland, Ohio, former chairman of the old Brier Hill Steel Co.; J. W. Deetrick, for many years vice-president of the Republic Iron & Steel Co.

Bought 26,000 Shares of Stock

The testimony developed that stock purchases made by Mr. Morris, involving some 26,000 shares of common stock of Sheet & Tube, purchased at a total cost of nearly $4,000,000, were paid for by Pickands, Mather & Co., and that Mr. Morris talked every day during the merger fight with Bethlehem officials in New York over a private telephone line installed in the Sheet & Tube offices at Youngstown. The highest price paid for any stock in the transactions was $180 a share, for the holdings of Julian Kennedy, Pittsburgh engineer, involving more than 5200 shares.

Today's questioning by attorneys for Mr. Eaton definitely linked President Eugene G. Grace of Bethlehem with the purchase of Sheet & Tube common stock. On direct question by Harry M. Crawford, attorney, Elton Hoyt, II, admitted having discussed the matter with Mr. Grace, and said the two went over the Sheet & Tube stockholders' lists. When Mr. Hoyt, acting for his firm, Pickands, Mather & Co., stated they could not well approach Julian Kennedy, Pittsburgh engineer, with regard to his stock because of a controversy with him at the time, Mr. Grace replied that he would take care of the matter.

To Question James A. Campbell

President Frank Purnell of the Youngstown Sheet & Tube Co. was the first witness today and testified he had not discussed his position in the merged companies with anyone, and that he did not know what his status is to be. He said that last year he received a salary of $40,000 from Sheet & Tube and a bonus of $50,000, or a total of $90,000. On April 1, this year, at the suggestion of the company's advisory committee and with the consent of Mr. Eaton, Mr. Purnell's salary was increased to $50,000 a year. He said that he did not know what Mr. Campbell's compensation has been. Mr. Eaton's attorneys desired to question Mr. Campbell, but he had gone to New York to attend a meeting of the American Iron and Steel Institute. However, he will be questioned early next week, and attorneys are also arranging to take depositions from Julian Kennedy, Pittsburgh.

Howard Burns, attorney for the Sheet & Tube management, said that arrangements would also be made to secure depositions from Mr. Grace and from Charles M. Schwab the latter part of next week. Attorneys for both sides have agreed to try the case for which the depositions are being taken as soon as possible. This will not be done, however, until Newton D. Baker, counsel for the Sheet & Tube group, has fully recovered from his recent illness.

Mr. Hoyt testified his firm spent nearly $7,000,000 for Sheet & Tube stock. He was asked why he had selected Grayson M. P. Murphy, New York, to purchase stock for him, and said it was because of friendship. He admitted, however, that Mr. Murphy had never previously handled any stock transactions for Pickands, Mather & Co. Depositions are to be taken next week from Mr. Murphy, also, who is a director of the Bethlehem company.

At a meeting of the board of directors of the Youngstown Sheet & Tube Co. on April 30, a price of $110 a share was fixed as the price to be offered to dissenting stockholders who demand cash for their shares.

Welded Girders Fabricated by Machine

(*Concluded from page* 1382)

mill. Both heads were welding at the time the photograph was taken. The machine ordinarily travels about 32 ft. an hour. It has a capacity for a weld 125 ft. long.

This machine has justified its application to the manufacture of crane girders and structural frames of trolleys. Some of the important improvements resulting from the use of automatic in place of hand welding are:

a. Quality of product improved
b. Production increased for a given floor area
c. Time saved in designing and manufacturing
d. Engineering improved
e. Reduction of waste material
f. Increased operator's productivity

It has been in service approximately a year and has completed 20 crane girders and a greater number of end trucks and trolley frames. It is considered as much a production tool, operating day after day, as the cranes, planers, boring mills, gear cutters, and other tools in the Cleveland Crane & Engineering Co. plant.

Surface Combustion Co., Toledo, Ohio, announces that, effective May 1, the Pittsburgh branch of the company and the office of the Mantle Recuperator Division were consolidated and occupied new offices at 617-619 Oliver Building.

Link-Belt Co. has moved its Baltimore office to 913 Lexington Building. H. D. Alexander is in charge.

Snow Flakes in Alloy Steel Forgings

(*Concluded from page* 1381)

These forgings, however, need not be consigned to the scrap heap.

Solid forgings may be re-worked to smaller sections and, providing these new forgings are carefully cooled, on examination they will be found to be entirely free from snow flakes. All these clinks, providing none are near the surface and subject to oxidation during re-forging, will weld up perfectly. These remarks apply equally to hollow forgings of thick section walls. They may be cut to suitable lengths and the walls re-forged on the mandril to thinner section which, on the most careful examination, will be found to be perfect forgings.

R. H. Greaves in his contribution on "Hair Line Cracks in Nickel-Chrome Steels" in the *Metallurgist*, November, 1926, states that snow flakes had not been observed in nickel-chrome-molybdenum forgings. Many instances have been seen in this material, of which Fig. 2 is one of the worst examples met with. Also in large hollow forgings made from ingots weighing up to 80 tons and more this unfortunate feature has developed. It is therefore evident that, although this non-temper brittle steel possesses many superior qualities over nickel-chrome steels, it requires equally careful treatment during all processes of manufacture to prevent formation of snow flakes.

Homestead Valve Mfg. Co., Inc., has appointed M. S. Maleson Co., Cleveland, as exclusive sales representative in northern Ohio, and George H. Fredricks & Co., Milwaukee, as sales representatives in Milwaukee for its water vapor cleaning machine.

Non-Ferrous Metal Markets

Copper Reduced — Tin at New Low—Lead Weak—Zinc Again Declines

NEW YORK, May 6.

Copper.—As the result of a buyers strike, further reductions in electrolytic copper have taken place, but the situation is chaotic and prices are still subject to change. On Monday two producers lowered their domestic quotation to 13c., delivered in the Connecticut Valley, and by the close of the day the entire market was at that level. Today there were further reductions by one or two sellers to 12.50c., at which some sales were made. It is stated that one seller was offering at 12.25c. at the end of the day. Primary producers late today were still holding at 13c., with some custom smelters at the 12.50c. level. The range of the market is therefore 12.50c. to 13c. for electrolytic copper, delivered in the Connecticut Valley. The quotation of Copper Exporters, Inc., was officially changed today to 13.30c. c.i.f., usual European ports.

The lower prices have not resulted in large sales, but it is confidently predicted that, when the market reaches bottom, consumers will buy on a large scale and that the results may be somewhat surprising. Lake copper is very quiet at 13c. to 13.12½c., delivered. Statistics for April are expected to show a considerable increase in refined stocks.

Copper Averages.—The average price of Lake copper for April, based on daily quotations in THE IRON AGE, was 16.04½c., delivered, New York. The average price of electrolytic copper was 15.67c. refinery, or 15.92c., delivered in the Connecticut Valley.

Tin.—Spot Straits tin at 32c., New York, today, sold at a new low level since Aug. 11, 1922, when it was also 32c. The decline since last week has been almost progressive daily. Several major causes are noted: Stocks in London warehouses on Saturday, May 3, increased 704 tons over those a week before, bringing the total to 18,576 tons. Store stocks here on April 30 were unusually large at 2519 tons and had increased to 2959 tons today. Shipments from the Straits in April were 9720 tons, a very large total, and estimates for the shipments in May are put at 10,500 tons. This was the main factor which broke the market.

The world's visible supply at the end of April had increased 3623 tons

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	May 6	May 5	May 3	May 2	May 1	Apr. 30
Lake copper, New York	13.12½	13.12½	14.12½	14.12½	14.12½	14.12½
Electrolytic copper, N. Y.*	12.25	12.75	13.75	13.75	13.75	13.75
Straits tin, spot, N. Y.	32.00	32.37½	33.37½	33.12½	33.00	33.75
Zinc, East St. Louis	4.65	4.70	4.70	4.70	4.70	4.70
Zinc, New York	5.00	5.05	5.05	5.05	5.05	5.05
Lead, St. Louis	5.35	5.40	5.40	5.40	5.40	5.40
Lead, New York	5.40	5.50	5.50	5.50	5.50	5.50

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 20.50c.
- Copper, hot rolled ..... 23.75c.
- Zinc ..... 10.00c.
- Lead (full sheets) ..... 8.25c.

Seamless Tubes—
- High brass ..... 25.50c.
- Copper ..... 26.00c.

Rods—
- High brass ..... 18.75c.
- Naval brass ..... 21.50c.

Wire—
- Copper ..... 15.50c.
- High brass ..... 21.00c.

Copper in Rolls ..... 22.75c.
Brazed Brass Tubing ..... 28.00c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 31.30c.
- Tubes, base ..... 42.00c.
- Rolled rods in coils ..... 31.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	20.50c.
Copper, hot rolled	26.00c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	10.05c.
Seamless Tubes—	
Brass	25.50c.
Copper	26.00c.
Brass Rods	18.75c.
Brazed Brass Tubes	28.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

- High brass ..... 20.50c.
- Copper, hot rolled, base sizes ..... 23.75c.
- Copper, cold rolled, 14 oz. and heavier, base sizes ..... 26.00c.

Seamless Tubes—
- Brass ..... 25.50c.
- Copper ..... 26.00c.

Brass Rods ..... 18.75c.
Brazed Brass Tubes ..... 28.12½c.

New York Warehouse

Delivered Prices, Base per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.25c. to 10.75c.
- *Zinc sheets, open* ..... 11.25c. to 11.75c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 35.00c. to 36.00c.
- Tin, bar ..... 37.00c. to 38.00c.
- Copper, Lake ..... 15.50c.
- Copper, electrolytic ..... 15.25c.
- Copper, casting ..... 15.00c.
- Zinc, slab ..... 6.25c. to 7.25c.
- Lead, American pig ..... 6.50c. to 7.00c.
- Lead, bar ..... 8.00c. to 8.50c.
- Antimony, Asiatic ..... 10.25c. to 10.75c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 24.00c. to 25.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 38.50c.
- Tin, bar ..... 40.50c.
- Copper, Lake ..... 15.50c.
- Copper, electrolytic ..... 15.25c.
- Copper, casting ..... 14.25c.
- Zinc, slab ..... 7.00c. to 7.25c.
- Lead, American pig ..... 6.38c. to 6.63c.
- Lead, bar ..... 8.75c.
- Antimony, Asiatic ..... 14.00c.
- Babbitt metal, medium grade ..... 17.50c.
- Babbitt metal, high grade ..... 41.50c.
- Solder, ½ and ½ ..... 25.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses. (Until the market settles, prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.75c.	10.50c.
Copper, hvy. and wire	8.00c.	10.00c.
Copper, light and bottoms	7.25c.	8.50c.
Brass, heavy	5.00c.	6.00c.
Brass, light	4.00c.	5.00c.
Hvy. machine composition	7.00c.	8.00c.
No. 1 yel. brass turnings	5.00c.	5.75c.
No. 1 red brass or compos. turnings	6.25c.	7.25c.
Lead, heavy	4.00c.	4.62½c.
Lead, tea	3.00c.	3.50c.
Zinc	2.75c.	3.25c.
Sheet aluminum	9.00c.	11.50c.
Cast aluminum	8.00c.	10.50c.

to the large total of 36,595 tons. Production of Straits tin for May is estimated at 8600 tons. Market observers naturally raise the question—if there is to be curtailment, when is it going to start?

Early in the week covered by this report buying was fairly heavy, but consumers were frightened away as the decline progressed. Today the market is exceedingly quiet. The situation in copper has had a harmful effect.

London prices today were the lowest in several years with spot standard quoted at £142 7s. 6d., future standard £144 5s. and spot Straits, at £144 7s. 6d., all about £14 per ton less than a week ago. The Singapore price today was £149.

Lead.—Due to lower prices in London and to large supplies abroad, the price situation here is somewhat weaker. The contract quotation of the leading interest is unchanged at 5.50c., New York. In the outside market carload and small lots are available at 5.35c. St. Louis, but the quotation of the leading producer there is still 5.40c. As a result of the weakness in the West, some metal is available in the East at 5.40c., New York.

Zinc.—A new low price for prime Western zinc was recorded today and the quotation fell to 4.65c., East St. Louis, or 5c., New York. The previous quotation at this level was on March 15, 1922. Demand is confined to small lots from only one or two producers who are willing to sell at these low levels.

The price of ore at Joplin is unchanged at $35. Sales last week were 8590 tons with output at 8200 tons. Shipments at 13,204 tons were the largest since last August, reducing the stocks in the Tri-State district to 12,683 tons.

Antimony.—In a weak market Chinese metal is lower, at 7.50c. for spot delivery and 7.62½c. for futures, both duty paid, New York.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. a lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c., delivered, the published price.

Non-Ferrous Metals at Chicago

CHICAGO, May 6.—Prices for copper, tin, and zinc have receded to new low levels. Users are cautious and sales are in small volume. The old metal market is quiet and prices are nominal.

Prices per lb., in carload lots: Lake copper, 12.75c.; tin, 33.12½c.; lead, 5.50c.; zinc, 4.80c.; in less-than-carload lots, antimony, 8.60c.. On old metals we quote copper wire, crucible shapes and copper clips, 9.50c.; copper bottoms, 8c.; red brass, 8c.; yellow brass, 6c.; lead pipe, 4.25c.; zinc, 2c.; pewter, No. 1, 17.50c.; tin-foil, 20c.; block tin, 26.50c.; aluminum, 8.50c.; all being dealers' prices for less-than-carload lots.

Reinforcing Steel

New Projects of 16,000 Tons Second Largest This Year

NEW work up for bids, totaling 16,000 tons, compares with 18,000 tons April 3, which was the largest for any week this year. Included are 3200 tons for a warehouse in New York and 4000 tons for sewer work in Louisville. Awards of 9000 tons, making one of the most active weeks in several months, include 2900 tons for State road work. Awards follow:

CREEDMOOR, N. Y., 800 tons, hospital, to Kalman Steel Co.

NEW JERSEY, 1200 tons, State highway, route 25, section 2; Foundation Co., New York, general contractor, to Truscon Steel Co.

NEW JERSEY, 165 tons, State highway, route 25, to Concrete Steel Co.

NEW JERSEY, 250 tons, State highway from Old Bridge to Englishtown, to Igoe Brothers.

JERSEY CITY, N. J., 500 tons, connecting link joining route 25 with Holland vehicular tunnel, Tunnel Construction Corporation, general contractor; to Kalman Steel Co.

WASSAIC, N. Y., 800 tons, State hospital, to Kalman Steel Co.

ELIZABETHTOWN, N. Y., 200 tons, reservoir for Elizabethtown Water Supply Co., to Concrete Steel Co.

WHITE SULPHUR SPRINGS, W. VA., 600 tons, addition to Greenbrier Hotel, to Truscon Steel Co.; John W. Cowper Co., Buffalo, general contractor.

SPRINGFIELD, ILL., 350 tons, State highway bridges, to an unnamed bidder.

SPRINGFIELD, 1250 tons, State road work; 500 tons to Calumet Steel Co., 500 tons to Republic Steel Corporation, 100 tons to Olney J. Dean & Co., 150 tons to Truscon Steel Co.

WAUKEGAN, ILL., 350 tons, power station for Public Service Co. of Northern Illinois, to Calumet Steel Co.; this is in addition to tonnage previously reported.

CHICAGO, 220 tons of reinforcing mesh for suburban districts, to Concrete Engineering Co.

CHICAGO, 160 tons, warehouse for the Fuji Trading Co., to Olney J. Dean & Co.

GALESBURG, ILL., 190 tons, first section of sewage disposal plant, to an unnamed bidder.

SHEBOYGAN, WIS., 1000 tons, power house for Wisconsin Power & Light Co., to an unnamed bidder.

ST. LOUIS, 900 tons, grain elevator for Missouri Pacific Railroad; 675 tons to Laclede Steel Co., 225 tons to Missouri Rolling Mills Corporation.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

WORCESTER, MASS., 250 tons, shoe factory.

NEW YORK, 3200 tons, Adelson warehouse, Hudson and Charlton Streets; general contract awarded to Commonwealth Engineering Co.

NEW YORK, 1200 tons, factory and warehouse, Watts Street.

NEW YORK, 150 tons, subway section 3, route 103, Essex and Rutgers Streets; general contract awarded to Clemente Contracting Co.

WEEDSPORT, N. Y., 200 tons, State road.

DETROIT, 2000 tons, municipal filtration plant and pumping station; Bryant & Detwiler Co., Detroit, low bidder on general contract.

DETROIT, 350 tons, addition to Detroit *News* building.

DEARBORN, MICH., tonnage unstated, Henry Ford colonial hotel.

LOUISVILLE, KY., 4085 tons, sewer work.

CHICAGO, 320 tons, Prudential State Bank building.

CHICAGO, 500 tons, foundations for outer drive bridge.

CHICAGO, 350 tons, addition to Morrison Hotel, John Griffiths & Co., general contractors.

SPRINGFIELD, ILL., 1000 tons, State road work, bids opened May 7.

GALESBURG, ILL., 1400 tons, second section of sewage disposal plant.

MILWAUKEE, tonnage being estimated, theater.

MENARD, ILL., 450 tons, addition to State penitentiary.

SEATTLE, 900 tons, approaches for Lake Union bridge, bids June 3.

Railroad Equipment

Orders for Freight Cars Total 566 Units

ORDERS for freight cars in the week totaled 566 units, of which the Union Refrigerator Transit Co. bought 500 refrigerator cars and the Warrior River Terminal 66 gondola cars. New inquiries appeared for 475 cars, of which 450 are for export. Details follow:

Union Pacific is inquiring for 20 ore cars of 70 tons capacity.

Indianapolis Union has ordered four eight-wheel switching locomotives from Baldwin Locomotive Works.

Western Fruit Express is in the market for 100 steel underframes.

Union Refrigerator Transit Co. has ordered 500 refrigerator cars from General American Car Co.

Amtorg Trading Corporation is inquiring for about 450 cars and a number of locomotives for shipment to Russia.

Fruit Growers Express is inquiring for 100 steel underframes in addition to 366 recently reported.

Warrior River Terminal has ordered 66 gondola cars from Pullman Car & Mfg. Corporation.

Illinois Steel Co. will buy five 100-ton flat cars.

To Consider Standardization of Pressure Gages

A conference of manufacturers and users of pressure and vacuum gages has been called by the American Standards Association to determine whether these interests favor the establishment of a national standard for such gages. The conference will be held in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, Thursday morning, May 15.

The establishment of an authoritative standard for pressure gages is considered of particular importance because of the hazards to life and property involved in the accuracy of a gage. One of the most serious hazards which the committee would attempt to eliminate is the possibility of the gages indicating zero when there is actually sufficient pressure to constitute a serious hazard if a boiler or tank is opened.

Fabricated Structural Steel

Spurt in Awards of a Week Ago Not Maintained in Past Week—Lettings Total 27,000 Tons

STRUCTURAL steel awards in the past week, at close to 27,000 tons, did not maintain the increased activity of the preceding week, when the total was 42,000 tons. New work that came into the market totaled slightly more than 20,000 tons.

Outstanding awards were 3575 tons for a post office in Baltimore, 3000 tons for an office building in Kansas City, Mo., 7000 tons for bridge requirements of the Santa Fe Railroad and 1600 tons for oil tanks at Bay City, Mich. Two prospective New York office buildings account for 9000 tons of the 20,000 tons of new work. Awards follow:

CHARLESTOWN, N. H., 600 tons, toll bridge, to unnamed fabricator.

PAWTUCKET, R. I., 192 tons, garage, United Railways Co., to Providence Steel & Iron Co.

PITTSFIELD, MASS., 160 tons, telephone exchange, to Lehigh Structural Steel Co.

PLYMOUTH, MASS., 104 tons, Plymouth Cordage Co. boiler house, to unnamed fabricator.

SPRINGFIELD, VT., 565 tons, building for Springfield Terminal Railway Co., to McClintic-Marshall Co.

SPRINGFIELD, VT., 500 tons, highway bridge over Connecticut River, to McClintic-Marshall Co.

NEW YORK, 450 tons, Church of St. Peter and St. Paul in Bronx, to McClintic-Marshall Co.

ALBANY, N. Y., 400 tons, four barges for New York State Barge Canal, to Midland Barge Co.

STATE OF PENNSYLVANIA, 120 tons, bridge in Adams County, to Bethlehem Steel Co.

LAWRENCE, N. Y., 160 tons, temple building, to unnamed fabricator.

BALTIMORE, 3575 tons, Post Office, to Lehigh Structural Steel Co.

WASHINGTON, 300 tons, memorial bridge, to American Bridge Co.

BREMO, VA., 1000 tons, Virginia Public Service Co., to Ingalls Iron Works.

LEHIGH VALLEY RAILROAD, 780 tons, five bridges, to McClintic-Marshall Co.

BALTIMORE & OHIO RAILROAD, 760 tons, express and produce building at Baltimore, to Dietrich Brothers.

WHITE SULPHUR SPRINGS, W. VA., 200 tons, addition to Greenbrier Hotel, to Wheeling Structural Steel Co.; John W. Cowper Co., general contractor.

PITTSBURGH, 100 tons, barge for Pure Oil Co., to Marietta Mfg. Co.

YOUNGSTOWN, 670 tons, Ohio Power & Light Co., to American Bridge Co.

BAY CITY, MICH., 1600 tons, tanks for Pure Oil Co., to Chicago Bridge & Iron Works.

SAGINAW, MICH., 365 tons, Peoples Building & Loan Bank, to Flint Structural Steel Co.

BIG FOUR RAILROAD, 450 tons, building at Indianapolis, to McClintic-Marshall Co.

CHICAGO, 420 tons, Oriental Institute for University of Chicago, to McClintic-Marshall Co.

CHICAGO, 400 tons, administration building for Chicago World's Fair, to an unnamed bidder.

CHICAGO, 400 tons, building for Crackerjack Co., to Jones & Laughlin Steel Corporation.

MILWAUKEE, 1500 tons, Allis-Chalmers Mfg. Co., to American Bridge Co.

KANSAS CITY, MO., 3000 tons, Bryant Building, to McClintic-Marshall Co.

ATCHISON, TOPEKA & SANTA FE, 7000 tons, 1930 bridge requirements, to American Bridge Co.

FOX HILLS, CAL., 475 tons, sound stage for Fox theaters, to Consolidated Steel Corporation.

SAN FRANCISCO, 150 tons, factory for Pacific Bone Co., to Dyer Brothers.

CHICO, CAL., 120 tons, assembly hall for Teachers College, to Minneapolis Steel & Machinery Co.

OAKLAND, CAL., 150 tons, 20-in. welded steel shore pipe for Port Commission, to Pacific Coast Engineering Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

CAMBRIDGE, MASS., 160 tons, Harvard School of Geography.

LUDLOW, MASS., 560 tons, State bridge.

BOSTON, 200 tons, City Hospital administration building.

HANOVER, MASS., 300 tons, tanks.

MONTPELIER, VT., 196 tons, hotel.

NEW YORK, 1350 tons, public schools in Queens; No. 13, 400 tons, and No. 151, 950 tons; bids open May 12.

NEW YORK, 300 tons, office building at 23 West Forty-seventh Street.

NEW YORK, 300 tons, garage on Perry Street.

NEW YORK, 4000 tons, office building, 70 to 80 Broad Street.

NEW YORK, 5000 tons, office building at Broadway and Forty-first Street.

PASSAIC, N. J., 200 tons, Post Office.

PENNSYLVANIA RAILROAD, 1000 tons, small bridges.

STATE OF PENNSYLVANIA, 600 tons, small girder spans, bids open May 15 and 16.

PHILADELPHIA, 500 tons, building for Temple University.

WASHINGTON, 500 tons, building for Brookings Institute.

DETROIT, 1800 tons, municipal pumping station and filtration plant; Bryant & Detwiler Co., Detroit, low bidder on general contract.

PIQUA, OHIO, 450 tons, for Val Decker Packing Co.

INDIANAPOLIS, 1600 tons, power house for Indianapolis Power & Light Co.

HARDIN, ILL., 2400 tons, highway bridge.

HARDIN COUNTY, ILL., 500 tons, highway bridges.

EVERETT, WASH., 375 tons, 30-in. welded steel pipe line; general contract to J. W. Hoover.

RICHMOND, CAL., tonnage unstated, assembly plant for Ford Motor Co.

Employment and Payroll Totals in Identical Plants in March and February (a)

	Establishments	Number on Payroll		Weekly Payroll (b) (Thousands)	
		March	February	March	February
Iron and steel	204	268,532	269,768	$8,475	$8,532
Foundry and machine shop	1,090	260,332	262,739	7,824	7,852
Machine tools	153	36,327	37,020	1,112	1,121
Hardware makers	70	29,559	30,075	699	742
Steam and hot-water appliances	110	29,785	30,439	818	847
Stoves	136	20,204	20,398	548	546
Structural ironwork	178	28,784	29,113	850	858
Cast iron pipe	39	10,771	10,367	257	236
Automobiles	204	348,756	343,873	11,439	10,904
Agricultural implements	85	31,578	31,395	954	937
Shipbuilding	93	43,063	43,521	1,316	1,314
Electrical machinery	207	202,868	204,385	6,225	6,212

(a) United States Branch of Labor Statistics.
(b) Average weekly envelopes were lower in iron and steel, hardware, structural ironwork and steam appliances; higher in all others.

Uses of Nickel Cast Iron

Outstanding applications of nickel cast iron are discussed in a neat booklet of some 35 pages, issued by the International Nickel Co., Inc., New York. Its title is "Notes on Uses of Nickel Cast Iron" and the five important industrial fields treated are the automotive, aeronautical, general machinery, machine tool and power industries. Attention is called to the fact that this booklet should not be confused with an earlier publication of the same name, distributed recently to foundry officials in this country and Canada. It is liberally illustrated and data are given on composition and properties of various nickel and nickel-chrome-iron types.

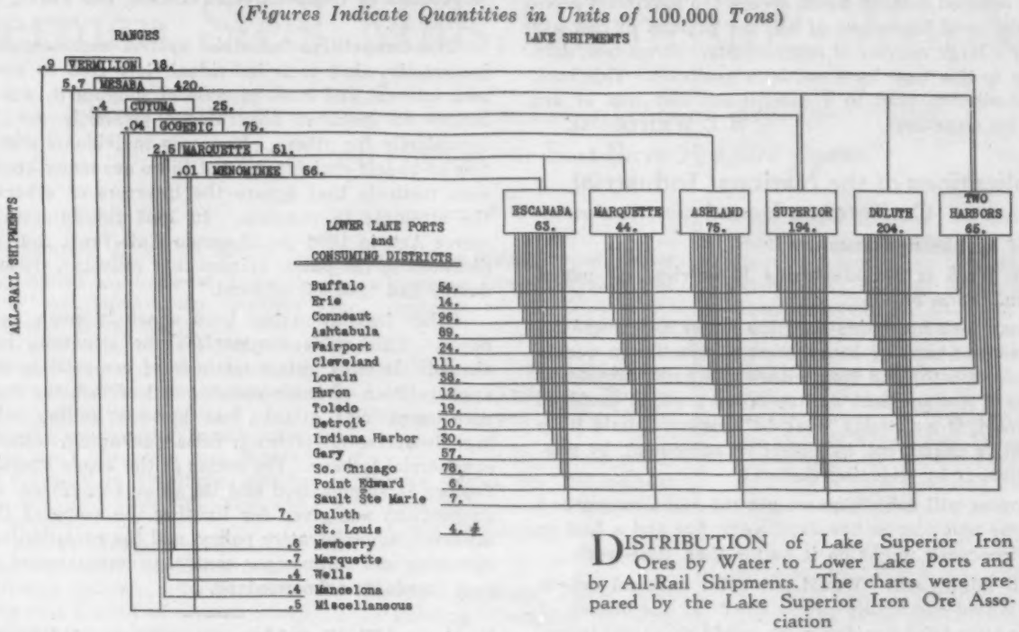
Electric Hoist Orders Gain

Members of the Electric Hoist Manufacturers Association report that the number of hoists ordered during the month of March increased 3.8 per cent, compared with the previous month, and the value of such orders increased 8.49 per cent. Shipments were 4.889 per cent larger in March than in February.

The Port Colborne blast furnace of the Canadian Furnace Co., Ltd., Port Colborne, Canada, which was banked on Feb. 12 for repairs and improvements, went into blast May 1.

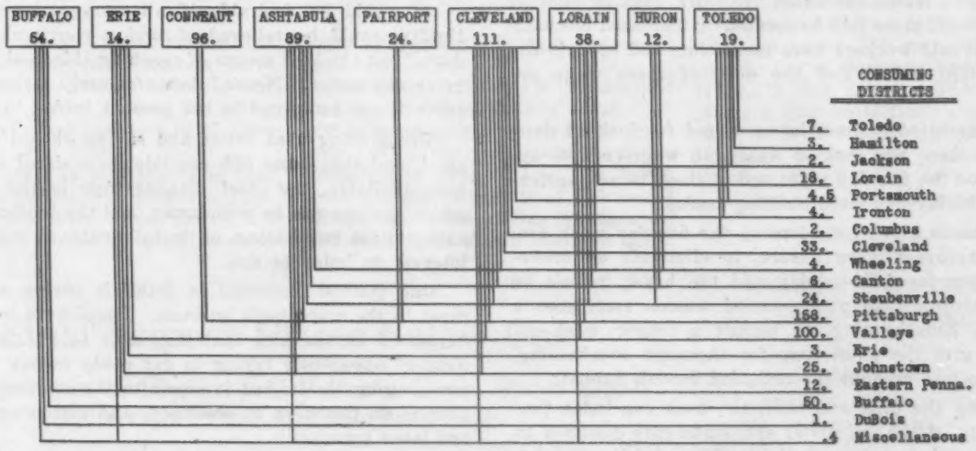
Sources and Distribution of Iron Ore in 1929

(Figures Indicate Quantities in Units of 100,000 *Tons)*

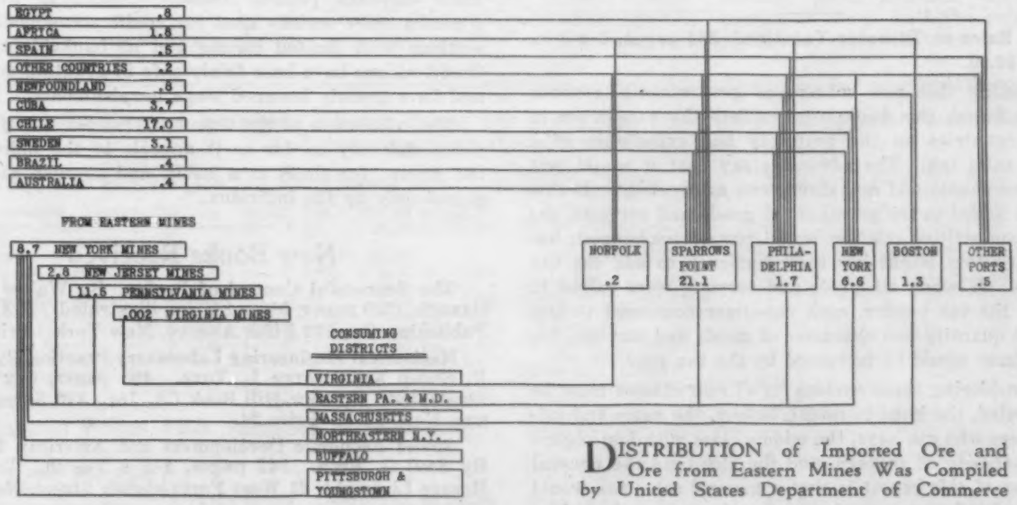


DISTRIBUTION of Lake Superior Iron Ores by Water to Lower Lake Ports and by All-Rail Shipments. The charts were prepared by the Lake Superior Iron Ore Association

LAKE ERIE PORTS



IMPORTED ORE



DISTRIBUTION of Imported Ore and Ore from Eastern Mines Was Compiled by United States Department of Commerce

Book Reviews

(*Concluded from page* 1384)

welders, detailed designs which secure the maximum economies, and most important of all, the savings in cost are given for a large number of representative structures, data which up to this time have not been available. This book will, undoubtedly, lead to a careful consideration of arc welding for structures. H. L. WHITTEMORE.

Publications of the National Industrial Conference Board

Reviewed by ROBERT GRIMSHAW.

Five Day Week in Manufacturing Industries. 69 pages, 6 x 9 in. Price $1.50.

We may look upon this question either as a mere rearrangement of working hours, or as a reduction in weekly work-time, or both; and from either viewpoint consider it merely as a management matter or as a social problem. In any event, if a five-day week be adopted, should it be by legislative enactment, by collective agreement, by popular opinion, or by widening custom?

Employers will ask: "Can we get the same output and at the same unit cost in five days, as in five and a half or six?" Piece-work might do it better than time-work.

We all might ask: "Would our total national output suffer? Would commodity prices rise? If one branch of industry adopted the five-day week would collateral industries suffer? For example, would the electrical peak-load be sharper? Would the same five work days be adopted by all? Would more jobs be created by increased mechanization? Would workers have more time and opportunity for spending; hence, feel the need of more wage per hour?"

These questions cannot be answered for lack of data. Less than three per cent of American wage-earners are operating on the five-day plan; and of these three-quarters are in the highly unionized building trades.

The reasons given for adopting the five-day week are: to give employees more leisure, to eliminate an uneconomical Saturday half-holiday and the lower morale on Saturday morning, to give married women employees a chance for housekeeping, to permit a longer week-end outing, to give the plant time for thorough overhauling, and to take into account the orthodox Jewish Sabbath.

Balancing the pros and cons, the book concludes that the majority of the industrial establishments qualified to appraise the advantages and disadvantages of the five-day work week would not recommend it.

General Sales or Turnover Taxation. 204 pages, 6 x 9 in. Price $2.50.

Assuming that new sources of governmental revenue must be found, this book inquires into the experience of sixteen countries on the propriety and expedience of a general sales tax. The advocates say that it would rest on the merchants and manufacturers, as overhead. If this tax were added to the prices of all goods and services, the sellers' competitive relation would remain unchanged; but demand factors might bar their tendency to add the tax to prices. If when all goods and services were raised in price by the tax burden, each consumer continued to buy the same quantity and character of goods and services, his expenditures would be increased by the tax load.

In considering these various "if's" four classes must be kept in mind, the hand-to-mouth buyers, the wage and salary earners who can save, the middle class with less regard for the sanctity of savings, and the rich, and the general conclusion of this report is that a general sales tax would be chiefly burdensome to the poorer classes, would reduce the volume of savings, and require a supplementary luxury tax to transfer some of the burden to the well-to-do.

Regulation of Competitive Practices. 320 pages, 6 x 9 in Price $3.

The competitive industrial system assumes, somewhat incorrectly, that each individual, left free to pursue his own interest and most capable of judging it, will use his means to greatest fruitfulness primarily for himself, secondarily for others. It grants individuals wide discretion as to self-enrichment; but there are many known business methods that ignore the interests of others; hence the attempts to regulate. In 1887 the Interstate Commerce Act, in 1890 the Sherman Anti-Trust Act, were indications of the public opinion that railways, trade and industry had "got out of hand."

Other legislation has been enacted; much more proposed. This work summarizes the situation, here and abroad. It cites unfair methods of competition and misappropriation of trade secrets; it describes the regulation of price policies, attacks less-than-cost selling, misbranding, deceptive advertising, false packaging, lotteries and commercial bribery. The action of the Trade Practice Conference is summarized and its value recognized. Useful suggestions are given for limiting the scope of the commission's administrative policy, and the contribution of cooperative and autonomous control to improvement of business standards acknowledged.

Employees' Thrift and Investment Plans. 114 pages, 6 x 9 in. Price $1.

It would be desirable if all workers, even the less thrifty, could be relieved of undue worry about "rainy days," but the best means of reaching this goal has caused much discussion. Needed data, formerly lacking, on this subject, are contained in the present book.

Recognizing that thrift and saving should be encouraged, and that some 800 possible methods of deposit are now available, the chief disadvantage is the ease with which savings can be withdrawn, and the tendency toward extravagant purchasing, on installments, at high rates of interest on balances due.

One method discussed in detail is saving and investment in the employer's business. Employers may be embarrassed by the idea that they may be put in the false light of apparently trying to get ready money instead of encouraging thrift; but it seems to the reviewer that the plan is an incentive to efficiency, and discourages strikes and labor turnover.

The third method reported on—savings combined with loans—appears popular because conditions throughout America show serious need for credit accommodation for workers with limited income and no bankable collateral. Credit unions have been fairly safe in granting such loans and have greatly lessened wage garnishments.

The conclusion of the report is that "the thrift plan is successful only so far as it appeals to the individual in the group; for thrift is a habit, and as such can be acquired only by the individual."

New Books Received

The Successful Control of Profits. By Walter Rautenstrauch. 239 pages, 5½ x 8¼ in., illustrated. B. C. Forbes Publishing Co., 120 Fifth Avenue, New York. Price $3.

Mechanical Engineering Laboratory Practice. By Charles F. Shoop and George L. Tuve. 488 pages, 6 x 9¼ in., illustrated. McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price $4.

Soviet Economic Development and American Business. By Saul G. Bron. 147 pages, 5¼ x 7½ in., illustrated. Horace Liveright, 61 West Forty-eighth Street, New York. Price $1.50.

German Steel Mills Dismissing Workers

French and German Costs Suggest Latter Loses on Exports—Welsh Tin Plate Output High as Far East Buys 500,000 Boxes

(*By Cable*)

LONDON, ENGLAND, May 5.

CONTINENTAL business here is quiet as buyers are seeking lower prices from European mills, but the Cartel minimum is generally maintained. The Continental situation is worse, with German makers dismissing more workers.

Finished steel is dull generally with works in need of orders and experiencing difficulty in obtaining specifications, especially from shipyards and export buyers.

The British Great Western Railway has ordered 100 tank locomotives from British builders, affording some relief to this branch of industry, but the outlook is unfavorable. Clyde launchings in April were 31,600 tons, the smallest total this year, and new contracting is poor.

Pig iron demand is slackening and three Middlesbrough furnaces have been blown out, two on hematite and one on basic, which reduces the active North East coast furnaces to 37 from 46 at the end of 1929.

Unsold stock is still heavy, so that further curtailment is probable. Consumers are seeking lower prices, but makers are unable to grant concessions expecting future increased costs.

Welsh Tin Plate Output Shows Increase Despite Quota Restriction.

* * *

Continental Manufacturers Plan Association to Protect Patent Rights in Far East.

* * *

Russia Loses on Manganese Ore Sales with Production Costs Increasing.

* * *

Krupp Interests Form Ore Trading Company in Rotterdam.

Tin plate activity is maintained and recent orders include about 500,000 boxes of oil sizes for eastern markets. Mills are well booked and the situation is firm. India has taken some prompt shipments of galvanized sheets, but is not buying for forward delivery. Black sheets continue quiet.

Steel Export Prices Below Cost

Comparison of French and German Costs Show Small French Profit and German Loss

HAMBURG, GERMANY, April 21.—An investigation of French and German steel production costs made by a French-German commission shows that it costs 82.25 m. ($19.57) per metric ton to produce Thomas steel in France. Of this cost, 12.34 m. ($2.94) represents ore, 37.01 ($8.81) coke and other fuels, 21.38 m. ($5.09) wages, 24.68 m. ($5.87) taxes and overhead. From the total cost, the amount received from sales of scrap, slag and other by-products, 13.16 m. ($3.13) has been deducted. The French selling price of steel averages 115.15 m. ($27.40) per metric ton in the domestic market and 98.70 m. ($23.49) per ton for export. With the cost of a ton of steel $19.57 and the minimum selling price at $23.49, French mills evidently have a moderate profit.

The cost of producing a ton of steel in Germany, according to the investigation, is 108.57 m. ($25.84), of which 47.70 m. ($11.35) is ore, costly since Germany must import iron ore; coke and fuel 20.56 m. ($4.89), wages 28.79 m. ($6.85), taxes and overhead 24.68 m. ($5.87). The value of scrap and other by-products is 13.16 m. ($3.13). The German selling price of a ton of steel averages 130 m. ($30.94) per metric ton in Germany and 101.99 m. ($24.27) for export. These figures show a loss on German export sales and, with 30 to 40 per cent of the German output sold abroad at the lower price, the loss to the German steel industry is considerable.

Leading German Mills Reduce Personnel

(*By Radio*)

BERLIN, GERMANY, May 5.

Except for minor changes in domestic and export prices, the iron and steel situation is unchanged and production is steadily declining. Semi-finished steel products are being quoted at about half the price level of March and deliveries on certain

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.8665 (par)

British Prices f.o.b. United Kingdom Ports

Ferromanganese, export	£10	15s.	to	£11	15s.	$52.30	to	$57.17
Billets, open-hearth	6	0	to	6	10	29.20	to	31.63
Black sheets, Japanese specifications	12	5				59.61		
Tin plate, per base box	0	18½	to	0	18½	4.46	to	4.50
						Cents a Lb.		
Steel bars, open-hearth	8	0	to	8	10	1.74	to	1.85
Beams, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Channels, open-hearth	7	12½	to	8	12½	1.66	to	1.87
Angles, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Black sheets, No. 24 gage	9	15	to	10	0	2.12	to	2.17
Galvanized sheets, No. 24 gage	11	17½	to	12	5	2.57	to	2.60

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£3	2½s.	to	£3	3½s.	$15.21	to	$15.45
Billets, Thomas	4	13	to	4	14	22.63	to	22.87
Wire rods, low C., No. 5 B.W.G.	6	2	to	6	4	29.69	to	30.19
Rails, light	6	0				29.20		
Black sheets, No. 31 gage, Japanese	11	5	to	12	12	54.68	to	58.32
						Cents a Lb.		
Steel bars, merchant	5	7½				1.18		
Steel bars, deformed	5	6½	to	5	7½	1.17	to	1.18
Beams, Thomas, British standard	5	1	to	5	2½	1.11	to	1.14
Channels, Thomas, American sections	5	12	to	5	14	1.24	to	1.26
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	6				1.17		
Angles, Thomas, 3-in.	5	7½				1.18		
Hoop and strip steel over 6-in. base	5	15				1.27		
Wire, plain, No. 8 gage	6	9				1.41		
Wire, barbed, 4-pt. No. 12 B.W.G.	10	10				2.28		
Wire nails, base	6	12½				$1.44 a keg		

products have been reduced to a fortnight.

The leading steel works are dismissing employees as they reduce operating rates to still lower levels. A slight improvement has appeared recently in demand for structural shapes, steel bars and certain sizes of pipe, but as a result of British reductions in pig iron quotations, the Continental market is weaker.

Foreign inquiry for heavy railroad materials, boilers and ship plates has improved. The German Wire Syndicate has reduced its prices for export 2s. 6d. (60c.) per ton and galvanized wire for export is off 5s. ($1.20) per ton. Minimum prices of the Continental Steel Cartel are being retained without change.

South African Steel Mills to Consolidate

JOHANNESBURG, SOUTH AFRICA, April 9.—The Union Steel Corporation has been organized to acquire and consolidate the South African Iron & Steel Co. and the Union Steel Corporation. A program of expansion and improvement will be instituted to include concentration of various branches of steel production.

Japan to Roll Sheet Piling

YOKOHAMA, JAPAN, April 8.—The Seitetsu Jo (Imperial Steel Works) is expected to start making its own design of steel piling about October. Japan consumes about 30,000 tons of sheet piling annually, all of which is imported at present. A trial rolling of about 100 tons will probably be made in October, after which the piling will be tested in actual use, probably being offered on the Japanese market early next year. The design is understood to be lighter than most of the imported sheet piling, being about 400 mm. (15.5 in.) wide and 10 to 12 mm. (0.39 to 0.46 in.) in thickness.

French Motor Car Sales Gain in Colonies

YOKOHAMA, JAPAN, April 8.—Commenting on French and American competition in motor car sales in a speech before the Fédération de la Mécanique, its president pointed out that, while French output is increasing, exports are diminishing. Since 1926, he said, American motor cars have secured a large part of the French foreign trade, with the result that French exports of 80 per cent of output have declined to about 59 per cent. This loss, however, has been offset in part by an increase from 20 to 41 per cent in sales to French colonies. He said that French methods are not adapted to mechanical production as applied in the United States. It was also pointed out that American selling methods are much better, the buyers' requirements being considered of paramount importance, while French sellers often adopt a rather independent attitude.

Soviet Losses High on Manganese Ore

HAMBURG, GERMANY, April 21.—Based on recent reports and statements by government officials in Soviet Russia, the government is losing heavily on manganese ore production in the Caucasus. The director of mines has stated that production costs have advanced about 34 per cent recently. Estimates by German ore dealers show that the Russian government is selling manganese ore from the Georgian mines at about 3d. (6c.) per unit less than the cost of production. However, the Soviet government is selling manganese ore regardless of costs to establish sufficient foreign credits for purchases of machinery and equipment required in its industrialization program.

German Steel Works to Shut Down May 15

DUSSELDORF, GERMANY, April 20.—On May 15, the Vereinigte Stahlwerke A. G. will close its plant at Duisburg-Ruhrort, dismissing 3200 employees. The works includes blast furnaces, open-hearth department and rolling mills. Lack of orders is given as the reason for suspending operations. Since Jan. 1, about 8000 workmen have been dismissed by the leading German steel producers, and during the Easter holidays practically all mills closed for five or six days.

Imperial Steel Works Contracts for Scrap

YOKOHAMA, JAPAN, April 12.—The Seitetsu Jo (Imperial Steel Works), which annually buys about 240,000 tons of steel scrap, about 200,000 tons imported and about 40,000 tons from Japanese sources, is reported to have concluded contracts with Japanese dealers for the coming fiscal year of the company. Prices are reported to be about 10 per cent lower than in the previous fiscal year, No. 1 heavy melting steel in the new contract being at 34 yen ($16.76) a ton, delivered.

Welsh Tin Plate Output Is Increasing

LONDON, ENGLAND, April 25.—Although Welsh tin plate mills are still operating on restricted schedules, based on quotas, production has been increasing, so that the total output of tin plate, even with the restrictions, is estimated to be as large as it ever has been. World tin plate requirements are increasing, with new fruit and vegetable packing plants being constructed abroad and plants for canning vegetables and soups being erected in Great Britain.

Farm Implement Exports Set New Record

Shipments of farm equipment from the United States during the first quarter of 1930 reached the hitherto unsurpassed total of $50,000,000, according to the Department of Commerce. Never before in the history of the industry have exports shown such a favorable trend so early in the year. This is an increase of 37 per cent over the like period of 1929, when shipments were $37,799,290, which amount was more than one-quarter of the total shipped during all of 1929.

The chief reason for this record total of exported implements is the large amount of equipment, particularly of tractors, sent to Russia during the quarter. Of the $50,000,000, almost $20,000,000 (two-fifths of the total) consisted of tractor shipments to Russia, as compared with tractor exports valued at $4,000,000 to the same country during the first three months of 1929.

Ludlum Catalog Gives Data on Alloy Steels

A new, loose-leaf catalog published by the Ludlum Steel Co., Watervliet, N. Y., attractively presents a wide range of information on the company's products. The folder, with leatherized covers, contains three sections of the catalog and is large enough to accommodate future additions.

Arranged for easy reference are size, cutting and annealing extras on tungsten and carbon steels, and there are nine pages describing the properties imparted to steel by carbon, silicon, phosphorus, sulphur, manganese, nickel, chromium, vanadium, molybdenum, tungsten, aluminum, uranium, cobalt and copper.

The company's high-speed and carbon tool steels are described, a page devoted to each quality, and information is included on the heat treatment, annealing, hardening and tempering of these steels, with lists of sizes, weights and prices.

A section of 36 pages gives useful information, such as conversion ratios of carbon and alloy steels, tables of temperature conversion and standard gages, freezing points of materials, S.A.E. steel specifications, abrasives and grinding wheel speeds, atomic weights and a table of Rockwell, scleroscope and Brinell strength relations.

A new metallurgical institute for research has been established in Freiberg, Saxony, Germany. It was formally opened and dedicated early this year. An elaborate book of 60 pages has been published, describing the officers and equipment. The institute is established in memory of Adolf Ledebur and Johannes Galli of whom excellent engravings decorate the early pages of the book.

Exports Make Partial Recovery

Gain 40,907 Tons Over February, But Are 32,619 Tons Behind Last Year—Imports Heavier, Also

WASHINGTON, April 26.—Aggregating 238,333 gross tons, exports of iron and steel products from the United States in March were the largest for any month since November, 1929, when they totaled 241,829 tons. They exceeded by 40,907 tons, or 20.7 per cent, outgoing shipments in February, which amounted to 197,426 tons.

Imports in March were 55,604 tons, the largest since last October's total of 63,226 tons. They showed a gain of 12,253 tons, or 28.3 per cent, over incoming shipments of 43,351 tons in February.

Exports for the first quarter, 660,849 tons, were under those for the like period of last year, 804,086 tons, by 143,257 tons, or 17.8 per cent. Imports during the first three months of 1930 were 141,269 tons, a decrease of 24,415 tons, or 14.1 per cent, from those of the first quarter of 1929, amounting to 165,684 tons.

Of the pig iron tonnage imported in March, 8707 tons came from India. Belgium supplied 12,391 tons of the structural shape importations; France, 3113 tons, and Germany, 2418 tons. Of the 3504 tons of steel bars imported, 1206 tons came from Belgium, 1112 tons from Germany, 676 tons from Sweden and 353 tons from France.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS
(Gross Tons)

	March	Feb.	Jan.
Austria	98	13	19
Belgium	16,429	9,542	9,966
Czechoslovakia	26	20	36
Denmark	....	....	150
France	5,328	5,558	3,266
Germany	9,457	9,200	7,545
Italy	252	264	192
Netherlands	1,023	274	448
Norway	3,019	354	188
Sweden	2,389	1,796	2,513
Switzerland	4	23	1
United Kingdom	3,478	4,247	5,109
Europe	*41,503*	*31,291*	*29,433*
Canada	4,393	4,640	6,837
Mexico	....	1	25
Cuba	45	....	47
British India	8,707	7,417	5,884
Japan	24	2	88
Hongkong	2	....	....
New Zealand	930	....	....
Total	55,604	43,351	42,314

Exports of Iron and Steel from the United States
(In Gross Tons)

	March		Three Months Ended March	
	1930	1929	1930	1929
Pig iron	1,742	4,083	5,772	11,970
Ferromanganese	1,445	525	1,722	735
Scrap	49,619	36,062	154,679	108,412
Pig iron, ferroalloys and scrap	*52,806*	*40,670*	*162,173*	*121,117*
Ingots, blooms, billets, sheet bars	2,101	11,218	8,451	13,894
Skelp	17,001	6,432	26,835	13,500
Wire rods	4,684	4,588	12,538	12,539
Semi-finished steel	*23,786*	*22,238*	*47,824*	*39,933*
Steel bars	9,836	17,623	29,718	57,419
Alloy steel bars	1,109	3,107	2,619	7,994
Iron bars	103	1,080	504	2,728
Plates, iron and steel	13,654	15,115	34,542	51,465
Sheets, galvanized steel	12,362	13,675	29,869	47,417
Sheets, galv. iron (a)	461		1,804	
Sheets, black steel	13,959	16,918	38,861	49,382
Sheets, black iron	1,195	1,351	3,391	3,529
Hoops, bands, strip steel	6,331	8,660	14,775	22,291
Tin plate, terne plate	23,142	24,478	71,665	77,552
Structural shapes, plain	16,775	24,685	46,149	63,477
Structural shapes, fabricated	10,227	8,067	32,394	33,499
Tanks, steel	2,133	.....	4,707	.....
Steel rails	8,532	11,277	21,253	45,309
Rail fastenings, switches, frogs, etc.	1,917	2,686	4,823	8,097
Boiler tubes	1,548	1,754	4,810	5,096
Casing and oil line pipe	8,711	12,351	23,628	46,765
Pipe, black and galvanized, welded iron (a)	1,437	13,829	5,994	36,269
Pipe, black and galvanized, welded steel (a)	7,688		24,855	
Plain wire	2,729	5,335	7,703	14,678
Barbed wire and woven wire fencing	3,319	6,576	8,617	18,747
Wire cloth and screening	136	141	467	494
Wire rope	295	748	1,275	2,092
Wire nails	853	2,051	1,902	5,138
Other nails and tacks	482	1,152	1,677	2,761
Horseshoes	36	77	46	124
Bolts, nuts, rivets and washers, except track	977	1,716	3,344	4,406
Rolled and finished steel	*149,947*	*194,452*	*421,392*	*606,729*
Cast iron pipe and fittings	5,078	3,802	11,043	8,313
Car wheels and axles	1,621	3,293	3,578	7,690
Malleable iron screwed fittings	990	1,068	3,744	3,361
Iron castings	653	1,372	2,128	3,823
Steel castings	1,293	735	2,341	3,518
Forgings	878	1,725	2,753	4,527
Castings and forgings	*10,513*	*11,995*	*25,587*	*31,232*
All other	1,281	1,597	3,873	5,075
Total	238,333	270,952	660,849	804,086

(a) Not separated prior to 1930.
(b) Not then reported.

Imports of Iron and Steel into the United States
(In Gross Tons)

	March		Three Months Ended March	
	1930	1929	1930	1929
Pig iron	12,182	8,572	30,162	40,979
Ferromanganese*	5,007	6,095	14,322	14,922
Ferrosilicon†	758	967	1,562	2,207
Ferrochrome‡	.....	36	87	79
Scrap	2,563	6,463	8,260	22,194
Pig iron, ferroalloys and scrap	*20,510*	*22,133*	*54,393*	*80,381*
Steel ingots, blooms, billets and slabs	1,449	1,681	5,004	5,239
Wire rods	1,355	1,365	3,414	3,143
Semi-finished steel	*2,804*	*3,046*	*8,418*	*8,382*
Rails and splice bars	721	157	1,418	971
Structural shapes	18,102	11,302	39,454	29,789
Boiler and other plates	306	.....	1,328	1,055
Sheets and saw plates	3,929	2,147	6,921	3,897
Steel bars	3,504	1,868	9,163	7,753
Bar iron	185	216	411	790
Hoops, bands and cotton ties	1,721	1,097	4,160	3,815
Tubular products (wrot.)	1,611	3,823	6,492	11,289
Nails, tacks, staples	444	547	1,313	1,313
Tin plate	6	31	28	89
Bolts, nuts, rivets and washers	22	26	97	67
Round iron and steel wire	485	584	1,207	1,726
Barbed wire	312	617	1,384	1,251
Flat wire; strip steel	132	119	441	435
Steel telegraph and telephone wire	.....	.....	1	.....
Wire rope and strand	225	323	677	609
Other wire	64	61	140	140
Rolled and finished steel	*31,769*	*22,918*	*74,635*	*65,489*
Cast iron pipe	366	4,502	3,367	10,910
Castings and forgings	155	146	456	522
Total	55,604	52,745	141,269	165,684
Manganese ore*	30,442	18,089	90,734	54,505
Iron ore	301,340	244,163	797,315	663,887
Magnesite	3,417	1,766	12,789	4,531

‡Chromium content only.
*Manganese content only.
†Silicon content only.

Where Steel Exports Went in First Quarter

Canada Took 125,341 Tons of Nine Leading Items—Japan Retains Second Position with 36,207 Tons, Followed by Chile, 10,962 Tons; Philippines, 10,486 Tons; Mexico, 8870 Tons; Argentina, 8549 Tons

Exports from United States, by Countries of Destination

(*In Gross Tons*)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	March		Three Months Ended March		March		Three Months Ended March		March		Three Months Ended March	
	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929
Canada	11,098	13,230	27,537	41,815	2,869	3,232	8,277	9,308	8,208	9,115	21,479	25,299
Japan	74	465	994	859	507	....	1,136	810	1,566	2,449	4,906	5,751
Cuba	7	13	358	629	496	536	1,162	1,653	102	46	173	503
Philippine Islands	114	63	262	81	3,696	2,391	7,691	8,817	36	785	861	1,682
Mexico	42	40	469	221	592	928	1,260	2,616	495	381	885	923
Argentina	....	....	....	....	200	517	660	1,977	640	321	1,269	1,190
Chile	....	....	....	....	....	....	....	....	....	922	....	1,447
Colombia	....	....	....	....	160	546	496	2,368	3	....	87	118

	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	March		Three Months Ended March		March		Three Months Ended March		March		Three Months Ended March	
	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929
Canada	1,020	1,958	1,649	4,760	327	345	607	556	1,178	2,156	2,461	5,335
Japan	426	....	1,657	1,300	....	....	....	....	64	233	147	711
Cuba	120	....	997	443	182	231	577	712	73	158	327	362
Philippine Islands	242	704	1,281	1,092	40	869	259	1,717	37	73	132	241
Mexico	137	106	309	1,403	771	565	1,798	2,090	200	111	537	469
Argentina	91	521	293	1,266	576	....	984	3,170	312	1,055	1,075	3,135
Chile	5,555	3,551	8,119	5,928	159	109	261	156	129	92	309	205
Colombia	....	1,407	1,032	1,839	52	298	267	1,300	23	....	87	....
Brazil	325	301	989	3,387	253	1,360	841	3,576	57	69	184	256

	Tin Plate				Steel Bars				Plain Heavy Structural Material			
	March		Three Months Ended March		March		Three Months Ended March		March		Three Months Ended March	
	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929
Canada	4,770	5,017	9,812	11,318	4,966	10,923	15,800	31,792	13,414	18,618	37,719	51,006
Japan	9,356	7,886	23,664	21,523	847	5,256	1,174	10,914	858	1,820	2,529	2,033
Cuba	681	1,024	1,203	2,077	134	496	517	1,582	836	395	1,465	935
Mexico	964	556	3,702	2,004	145	66	298	279	....	....	81	....
Argentina	734	1,884	4,003	8,033	11	....	59	132	....	....	206	1,861
Chile	282	631	972	1,754	274	....	591	....	429	780	710	1,918
Brazil	249	126	933	1,090	40	546	282	1,082	....	....	....	....
China	2,740	1,727	8,476	8,643	....	....	....	....	....	....	....	....
British India	....	89	5,217	2,999	....	....	....	....	....	....	....	....
United Kingdom	....	....	....	....	1,584	2,549	5,793	6,615	....	....	....	....
Italy	330	455	2,190	1,644	....	....	....	....	....	....	....	....

Destination of Iron and Steel Exports

(In Gross Tons)

Country of Destination	March, 1930	March, 1929	January Through March 1930	January Through March 1929
North and Central America and West Indies	*121,524*	*135,333*	*310,936*	*378,586*
Canada and Newfoundland	101,282	113,359	251,829	303,241
Cuba	4,250	5,273	12,273	17,907
Guatemala	308	1,039	989	2,050
Honduras	1,168	1,890	2,537	4,690
Mexico	10,976	6,443	28,690	20,249
Panama	1,166	1,435	5,464	6,668
Salvador	124	492	559	2,515
British West Indies	829	1,598	3,645	9,096
Other West Indies	856	3,116	3,966	9,305
Other Central America	365	1,688	984	2,865
South America	*29,287*	*41,197*	*82,971*	*133,472*
Argentina	3,940	8,337	12,646	33,963
Brazil	4,282	3,792	11,514	17,246
Chile	10,621	8,034	22,960	17,480
Colombia	1,770	7,111	8,451	16,488
Peru	1,351	3,483	4,667	12,070
Uruguay	1,182	967	3,980	4,457
Venezuela	5,939	8,874	17,269	30,372
Other South America	202	599	1,484	1,396
Europe	*22,806*	*32,461*	*68,785*	*91,586*
France	767	1,447	2,557	7,078
Germany	1,022	2,693	3,731	5,648

Country of Destination	March, 1930	March, 1929	January Through March 1930	January Through March 1929
Italy	9,595	8,781	25,644	32,227
Poland and Danzig	4,228	8,939	4,229	20,785
Soviet Russia	217	407	1,810	1,404
Spain	75	140	10,411	1,122
Sweden	144	313	1,105	996
United Kingdom	3,313	6,119	12,026	15,891
Other Europe	3,445	3,622	7,272	6,435
Far East	*63,797*	*59,349*	*193,385*	*194,143*
British Malaya	632	341	2,931	2,564
China	4,544	4,776	15,634	22,849
Netherlands East Indies	5,579	8,062	13,227	26,337
India and Ceylon	619	1,243	9,030	8,018
Hong Kong	51	181	1,415	2,135
Japan	39,581	30,430	119,005	90,238
Kwantung	886	1,389	1,350	6,451
Philippine Islands	10,170	11,108	22,762	26,577
Australia	850	1,309	3,657	5,635
New Zealand	119	197	1,269	1,167
Other Asia and Far East	766	313	3,105	2,172
Africa	*1,119*	*2,612*	*4,772*	*6,299*
Union of South Africa	665	1,190	1,345	1,936
Egypt	32	1,054	2,115	3,488
Mozambique	151	105	757	255
Other Africa	271	263	555	620
Total	238,333	270,952	660,849	804,086

Huge Machinery Exports Continue

Largest Total for Any Quarter—Agricultural Implements More Than One-Fourth of All

WASHINGTON, April 26.—Exports of American machinery in March rose to a value of $56,069,218 from $52,517,811 in February, but showed a decline of $3,392,961 under the high record in March of last year, with a total of $59,482,179. For the first quarter of 1930, however, they increased to a new high record at $169,944,464, from $155,807,193 (the previous record) in the corresponding period of last year, a gain of $14,037,271, or 9 per cent.

Exports of agricultural implements continued heavy in March, at $15,277,000, but were considerably below the record of $21,272,000, made in February.

Exports of wheel tractors to Soviet Russia in March were $2,076,826, while similar shipments to Canada were $1,744,136. This class of shipments to Russia during the first quarter was $14,986,363 this year, against $4,183,192 last year. Exports of track-laying tractors to Soviet Russia in the first quarter were valued at $4,476,219 this year, against $95,635 last year.

Exports of power-driven metal-working machinery for the first quarter were valued at $9,853,656, compared with $8,885,830 last year.

Exports of metal-working machinery, as listed in THE IRON AGE table, included 1119 units, valued at $2,499,027, against 934, valued at $1,539,846, in February.

Imports of machinery and vehicles in the first quarter were valued at $10,207,059, against $10,134,443 in 1929. Imports of machinery, as listed in THE IRON AGE table, were valued at $2,923,498 in March, against $2,740,206 in February and $2,989,389 in March of last year. For the first quarter, they were valued at $7,919,194 in 1930, compared with $8,011,868 last year.

Imports of industrial, office and printing machinery for the first quarter were valued at $5,132,008, compared with $6,057,678 in the like period of last year.

Machinery Exports from the United States

(By Value in Thousands of Dollars)

	March		Three Months Ended March	
	1930	1929	1930	1929
Locomotives	$167	$93	$250	$645
Other steam engines	36	65	172	224
Boilers	100	200	426	488
Accessories and parts	26	48	169	271
Automobile engines	1,521	1,920	2,783	4,016
Other internal combustion engines	955	812	1,761	2,041
Accessories and parts	329	473	382	1,147
Electric locomotives	138	48	316	231
Other electrical machinery	1,147	1,352	2,924	3,328
Excavating machinery	1,234	787	3,064	1,727
Concrete mixers	122	138	279	412
Road making machinery	322	284	963	671
Elevators and elevator machinery	517	476	1,608	1,345
Mining and quarrying machinery	1,407	1,545	4,689	4,127
Oil well machinery	3,367	2,197	9,561	5,940
Pumps	802	1,098	2,647	3,489
Sheet and plate metal-working machines	605	352	1,141	857
Forging machinery	159	206	602	369
Machine tools*	2,939	2,143	6,642	5,096
Other metal-working machinery and parts	545	729	1,688	1,902
Textile machinery	931	1,640	2,711	3,855
Sewing machines	687	1,050	2,152	2,872
Shoe machinery	144	206	442	599
Flour-mill and gristmill machinery	59	29	100	179
Sugar-mill machinery	95	307	404	585
Paper and pulp mill machinery	221	213	788	674
Sawmill machinery	94	69	283	211
Other woodworking machinery	156	210	495	539
Refrigerating and ice making machinery	500	1,673	1,154	3,498
Air compressors	457	762	1,688	2,000
Typewriters	1,787	2,499	5,697	6,449
Power laundry machinery	150	148	480	477
Typesetting machines	370	2,499	1,067	6,448
Printing presses	475	690	1,305	1,917
Agricultural machinery and implements	15,277	13,858	50,255	36,799
All other machinery and parts	19,395	20,015	61,780	53,707
Total	$56,089	$59,482	$169,944	$155,807

*Principal details in another table.

Imports of Machinery into the United States

(By Value)

	March		Three Months Ended March	
	1930	1929	1930	1929
Metal-working machine tools	$55,375	$132,899	$321,747	$318,020
Agricultural machinery and implements	1,632,884	999,826	4,051,107	2,366,620
Electrical machinery and apparatus	180,191	230,286	430,238	570,131
Other power-generating machinery	12,041	179,150	102,217	277,288
Other machinery	818,649	1,072,025	2,420,179	3,344,457
Automobiles and other vehicles, except agricultural	224,358	375,203	593,706	1,135,352
Total	$2,923,498	$2,989,389	$7,919,194	$8,011,868

Exports of Power-Driven Metal-Working Machinery

	March, 1930		February, 1930	
	No.	Value	No.	Value
Engine lathes	103	$227,109	95	$209,961
Turret lathes	48	179,958	34	111,568
Other lathes	81	109,060	45	100,151
Vertical boring mills and chucking machines	29	74,002	24	58,661
Thread-cutting and automatic screw machines	65	116,762	69	105,254
Knee and column-type milling machines	32	88,640	27	57,456
Other milling machines	45	131,611	51	76,514
Gear-cutting machines	54	54,208	20	94,532
Vertical drilling machines	18	34,390	119	97,814
Radial drilling machines	23	81,357	11	20,950
Other drilling machines	295	143,864	187	229,197
Planers and shapers	55	213,116	16	30,911
External and cylindrical grinding machines	70	165,180	33	76,020
Internal grinding machines	62	169,832	89	200,507
Metal-working tool-sharpening machines	134	709,938	114	70,350
Total	1,119	$2,499,027	934	$1,539,846

Machinery Markets and News of the Works

Business Not Gaining

Machine Tool Orders in April Probably Not Equal to the March Volume

MACHINE tool business shows no gains. The activity of week before last at Chicago has subsided with the placing of large orders by the Nash Motors Co. and the Majestic Household Utilities Corporation. In other principal centers the demand for tools is dull.

While a few companies did slightly better in April than in March, it is probable that this was not true of the industry as a whole. Reports show a falling off in sales last month as compared with the previous month.

Quotations are still outstanding on a great number of machine tools, but these are being acted upon in a very small percentage of cases. Prospective buyers are not finding sufficient improvement in their own businesses to encourage expenditures for new equipment.

As tools are shipped, deliveries are shortening, as new business is not equal in volume to shipments. Some machine tool builders are depending on current demand to sustain production.

New York

NEW YORK, May 6.—The past week has brought no signs of improved demand for machine tools. April business with most sellers in this market was about on a par with that of March. With a great deal of buying in prospect, a pick-up in sales awaits a more active demand for the products which these prospective purchasers make.

Kelvinator Sales Corporation, 1 West Forty-seventh Street, New York, operated by Kelvinator Corporation, Detroit, manufacturer of electric refrigerating equipment, has plans for a three-story factory branch, service and distributing plant at Long Island City, to cost about $300,000 with equipment. Shampan & Shampan, 188 Montague Street, Brooklyn, are architects.

Alfred H. Eccles, 29-28 Hunter Avenue, Long Island City, architect and engineer, has awarded general contract to William Flaherty, 8501 Fifty-seventh Avenue, Elmhurst, L. I., for a one-story automobile service, repair and garage building, to cost about $115,000 with equipment.

Long Island Lighting Co., 50 Church Street, New York, will carry out an expansion program in plants and system on Long Island, including extensions in steam-operated electric generating station at Glen Head; additions in transmission lines to connect with main system between Rockaway and Great Neck to East Marion, Montauk and vicinity, and new power substations at Syosset, Newbridge and other points, entire project to cost about $10,000,000. Ellis H. Phillips is head.

Warner-Quinlan Co., 2 Park Avenue, New York, operating oil refineries and distributing plants, with main refinery at Warners, N. J., is arranging an increase in capital from 1,000,000 to 1,500,000 shares of stock, part of proceeds to be used for expansion.

Westinghouse Lamp Co., 150 Broadway, New York, an interest of Westinghouse Electric & Mfg. Co., same address, will remove its plant from six-story factory at 35 Steuben Street, Brooklyn, to a building recently completed at Bloomfield, N. J., to be given over to manufacture of miniature lamps for motor car, flashlight and kindred service. Present capacity will be increased. It is proposed to have Bloomfield unit ready for service in about four months. Company has removed radio tube manufacturing division from Bloomfield to Harrison, N. J., where production is being concentrated by R. C. A. Radiotron Co., recently formed as a subsidiary of Radio Corporation of America, New York, to take over radio tube interests of that company, Westinghouse company and General Electric Co. Branch plants are being operated at Newark, N. J.; Cleveland and Indianapolis.

Board of Education, Amsterdam, N. Y., plans installation of manual training equipment in new two-story high school in Northampton Park, to cost $750,000, for which bids will soon be asked on general contract. H. F. Daly, 15 East Main Street, is architect.

In connection with acquisition of plant of American Plate Glass Co., Kane, Pa., final negotiations for which are now under way, Indestructo Glass Corporation, 527 Fifth Avenue, New York, with main works at Farmingdale, L. I., plans construction of new shatterproof glass manufacturing unit, to cost over $1,000,000 with equipment, and will concentrate production at Kane plant. Entire plant will give employment to about 700 operatives.

S. Parisi, 1611 Hendrickson Street, Brooklyn, has revised plans for a two-story ice-manufacturing plant at Corona, L. I., to cost about $175,000 with machinery. Burke & Olsen, 22 Court Street, Brooklyn, are architects.

Hillas Motor Car Co., 39 Sussex Avenue, Newark, has leased two-story and basement building, 100 x 190 ft., to be erected at Central Avenue and South Twelfth Street, for a service, repair and sales building, to cost about $125,000 with equipment. General contract has been let to Fred Kilgus, Inc., 13 South Sixth Street. Henry D. Scudder, Jr., 9 Clinton Street, is architect and engineer.

Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, has acquired property near plant at Harrison, N. J., for expansion.

John P. Callaghan, Inc., 18 Passaic Avenue, Harrison, N. J., building materials, has purchased part of former plant of American Agricultural Chemical Co., Newark, totaling about three acres, fronting on Passaic River, and will construct new storage and distributing plant, including concrete dock with mechanical-handling equipment.

C. M. Grey Mfg. Co., 358 Central Avenue, East Orange, N. J., manufacturer of die castings, etc., has plans for new factory to cost about $70,000 with equipment. Austin Co., New York, is architect and engineer.

Helwig Welding Co., 1374 Springfield Avenue, Irvington, N. J., has plans for a one-story plant, 50 x 110 ft., to cost about $25,000 with equipment. Frank D. Trainer & Son, Inc., 12 Smith Street, is architect.

Board of Education, Essex County Vocational Schools, Hall of Records, Newark, Robert O. Beebe, director, will receive bids until May 15 for vocational school equipment.

Public Service Electric & Gas Co., 80 Park Place, Newark, has plans for two-story power substation at Piscataway, N. J., to cost about $200,000 with equipment. Company has also filed plans for two-story substation at Newark, to cost about $70,000. C. W. Fairweather is company architect.

United States Fare Recording Co., Inc., 512 West Fifty-fourth Street, New York, manufacturer of recording instruments and die castings, is now making a full line of production counters and meters.

Buffalo

BUFFALO, May 5.—Norton Co., Buffalo Avenue and Twenty-eighth Street, Niagara Falls, N. Y., manufacturer of abrasives, with headquarters at Worcester, Mass., is arranging for removal of local plant to Chippewa, Ont., where production for this district will be concentrated in future. Several additional buildings will be erected at Chippewa plant for increase in present output. Company has disposed of Niagara Falls plant to Mathieson Alkali Works, Inc., which operates plant adjoining at 2400 Buffalo Avenue, and structures will be improved for expansion. Charles F. Vaughn is manager of Mathieson plant.

Board of Public Works, Municipal Building, Buffalo, George F. Fisk, commissioner, will receive bids until May 15 for hand-power ash hoists, wire fencing, etc., for city-owned buildings.

Speed-E-Way Perfect Laundries, Inc., Buffalo, care of O. L. Bartlett, 619 Jackson Building, plans installation of steam power plant, conveying and other mechanical-handling equipment in new plant to cost over $350,000, for which bids will soon be asked on general contract.

Roland F. Buckman, 433 North Aurora Street, Ithaca, N. Y., and associates have organized Typhoon Machine Corporation and plan operation of local plant for manufacture of drying machinery and appliances. John L. Murphy, 602 North Cayuga Street, is also interested in new company.

Ford Motor Co., Dearborn, Mich., is considering purchase of waterfront site at Buffalo for new plant for salvaging discarded automobiles, including metal-reclaiming works with electric furnaces and auxiliary equipment, reclaimed material to be shipped by water route to Dearborn plant and utilized there as raw material.

New England

BOSTON, May 5.—The machine tool industry appears to be conserving purchases in all lines. The first quarter of 1930 is regarded as the leanest period experienced by new tool dealers in a long time. In contrast with the new tool market, used equipment continues to sell comparatively well, although sales in the past week did not total in value those of the previous week. The number of individual sales made, however, held its own.

In small tools sales in April were below those of the corresponding month last year, and about equal to those of March this year.

L. Antico, Reading, Mass., contractor, has plans for a small foundry; owner's name temporarily withheld.

Merrimac Chemical Co., Everett, Mass., has plans for a power plant, including motors and miscellaneous electrical equipment.

Equipment, including small lathes, milling machines, planers, drill presses, radial drilling machines, boring mills, motors, etc., in plant of Blake Pump & Condenser Co., Fitchburg, Mass., is being disposed of at private sale.

Crocker, Burbank & Co., Westminster Street, Fitchburg, Mass., manufacturers of paper products, bristol board, etc., have asked bids on general contract for an addition, to be known as unit No. 8, to cost over $85,000 with equipment. George F. Hardy, 309 Broadway, New York, is engineer.

Walworth Mfg. Co., Summer Street and Causeway, Boston, manufacturer of pipe, valves, etc., plans rebuilding part of pipe department destroyed by fire April 30.

C. H. Lockwood, 171 Westminster Street, Providence, R. I., architect, has plans for an addition to factory of a local jewelry and plated ware manufacturing company, name temporarily withheld, to cost about $45,000 with equipment.

Board of School Trustees, New Milford, Conn., has authorized installation of manual training department in new junior and senior high school to cost $110,000, for which plans will be drawn by Towner Sellew Associates, 363 Main Street, Middletown, Conn., architects. Bids on general contract will be asked in June.

Stone & Webster, Inc., 49 Federal Street, Boston, engineer, has acquired a substantial interest in Pitney-Bowes Postage Meter Co., Stamford, Conn., manufacturer of mailing machines and devices, and will be active in management.

National Railway Signal Co., 1529 Columbus Avenue, Boston, has leased part of factory at 69-71 A Street, South Boston, for new plant. It is understood that present works will be removed to new location and capacity increased.

South Atlantic

BALTIMORE, May 5.—Bethlehem Steel Corporation, South Bethlehem, Pa., has plans for one-story building at Sparrows Point plant, Baltimore, to cost about $100,000. Bissell & Sinker, 1520 Locust Street, Philadelphia, are architects.

Board of Trustees, University of Virginia, Charlottesville, Va., is planning addition to steam power plant to cost over $75,000 with equipment. Dr. Edwin A. Alderman is president.

Board of District Commissioners, District Building, Washington, will receive bids until May 20 for an air compressor; until May 16 for portable gasoline-driven air compressor.

Board of Managers, Maryland Training School for Boys, Lock Raven, is asking bids on general contract until May 20 for new vocational school building. Henry P. Hopkins, 347 North Charles Street, Baltimore, is architect; bids will be received at last-noted office.

Union Iron Foundry, Union, S. C., is to rebuild part of storage and distributing plant recently destroyed by fire.

Asheville Gas Co., Asheville, N. C., is planning extensions and improvements in gas generating station and system, including installation of tar separator, tanks, pipe lines, etc., to cost over $60,000 with equipment.

North American Button Mfg. Co., Howard and Palmer Streets, Philadelphia, will lease a building to be constructed by city officials at McKenney, Va., for new plant with about 10,000 sq. ft. floor space, superstructure to begin at once, to cost about $50,000 with equipment. An additional unit will be built later. C. W. Doyle and C. F. Baskerville, McKenney, are in charge.

Southern Power Co., Charlotte, N. C., has acquired municipal electric light and power plant at Pickens, S. C., and plans extensions and installation of additional equipment.

City Water Bureau, Baltimore, E. G. Rost, water engineer, is asking bids on general contract until May 14, for a water storage plant for municipal waterworks, to cost $100,000 with equipment.

Walter R. Talbot, Winchester, Va., and associates are planning early operation of glass sand properties in western part of Frederick County, where large deposit has been secured. A complete mining and refining plant will be installed, including storage and distributing facilities. A company will be formed, headed by Mr. Talbot, to carry out project.

Odom Battery & Tire Co., 138 Spring Street, Spartanburg, S. C., is planning purchase of equipment for new service and repair works, now in course of erection, including air compressors, gas pumps, gas tanks, vulcanizing equipment, rotary lift, and other tools. W. D. Hull is manager.

Philadelphia

PHILADELPHIA, May 5.—Ryan, Scully & Co., Wissahickon Avenue and Yelland Street, Philadelphia, manufacturer of furnaces, forges, controllers, etc., will soon take bids on general contract for a new plant unit, to cost about $50,000 with equipment. G. B. Roth, 1629 Chestnut Street, is architect.

Gilmour Steel Products Co., 1505 Race Street, Philadelphia, will build a new steel runway at plant at Whitaker and Godfrey Avenues.

Universal Brass Works, 209 Vine Street, Philadelphia, has leased 5000 sq. ft. floor space in building at Lehigh Avenue and Howard Street for expansion.

Department of Supplies and Purchases, City Hall Annex, Philadelphia, Jay Lit, director, is asking bids until May 12 for a stone crusher, one-man power grader, semi-steel casting for pump chamber, tractors, truck loader, gasoline-driven portable non-lifting drum type mixer, and other equipment.

Standard Oil Co. of Pennsylvania, Inc., Ledger Building, Philadelphia, has asked bids on general contract for an oil storage and distributing plant at Pennypacker Avenue and Schuylkill River, to cost more than $75,000 with equipment.

Lincoln-Circle, Inc., Mascher and Turner Streets, Philadelphia, manufacturer of oils, greases, etc., has leased one-story building at 2032-34 North Sixth Street, for expansion, storage and distribution.

Bushong Motors, Inc., Broad and Brown Streets, Philadelphia, has leased three-story building at 304 North Broad Street, with L-extension totaling 20,000 sq. ft. floor space, for a service, repair and sales building.

Board of Education, Mount Holly, N. J., contemplates installation of manual training department in new high school, to cost about $200,000, for which plans are being completed.

John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire rope, cables, etc., has taken out a permit for one-story addition for which general contract recently was let to Hoggson Brothers, Trenton, to cost $125,000 with equipment.

York Hoover Body Corporation, Belvidere and Linden Streets, York, Pa., manufacturer of automobile bodies, has awarded general contract to Hess Brothers, Grantley Road, for two-story addition, to cost about $40,000 with equipment. W. H. Swartz, 515 Prospect Street, is architect.

Safe Harbor Water Power Co., Lexington Building, Baltimore, an interest of Pennsylvania Water & Power Co., Holt-

wood, Pa., has secured permission to erect a hydroelectric generating plant at Safe Harbor on Susquehanna River, near Holtwood, and will begin construction of power dam at once. Station will cost over $25,000,000 with steel tower transmission line to Baltimore and other points.

Warner Co., Wilmington, Del., sand, gravel, crushed stone, etc., is carrying out expansion in storage and distributing terminal on South Side wharves, to include installation of cranes and other material-handling equipment, concrete mixing plants, elevated bins and other facilities, to cost about $100,000. Company has acquired local building material division of Edward R. Pusey Co., 819 Shipley Street, and will consolidate; additional expansion will be carried out. Charles Warner is head.

Firestone Tire & Rubber Co., Akron, Ohio, has asked bids on general contract for a factory branch, service and distributing building at Chelten and Wayne Street, Philadelphia, to cost over $70,000 with equipment.

Cleveland

CLEVELAND, May 5.—Machine-tool sales were quiet the past week, the improvement noted during the previous week not being maintained. A fair amount of business is in prospect, mostly in single machines, but most prospective purchasers are delaying placing orders until their plants become busier. Machine shops in Akron that specialize on tire mold work are showing some interest in new equipment. The market is quiet in Detroit where little business is being placed by automobile manufacturers and very little new demand is coming from automobile parts makers in this territory. The General Motors Corporation is inquiring for a few machines for its radio plant at Dayton, Ohio.

United States Gypsum Co., 300 West Adams Street, Chicago, is planning expansion at plant of subsidiary, Youngstown Pressed Steel Metal Lath Division, Warren, Ohio, recently organized to take over such branch of business of Youngstown Pressed Steel Co. Plant now occupies a leased building and company-owned factory will be provided, with facilities for increased output. Company is also planning establishment of other plants in this district for production of other steel products used in buildings.

Wellsville Mfg. Co., Wellsville, Ohio, care of Raymond D. Knepper, Wellsville, attorney, recently organized by local interests, has leased property on Main Street for establishment of plant to manufacture mechanical toys. New company is headed by Harry L. Seese and John F. Donahue, both of Wellsville.

F. E. Myers & Brothers Co., Church Street, Ashland, Ohio, manufacturer of pumps, waterworks equipment, farm tools etc., is arranging for increase in capital part of fund to be used for expansion.

Prest-O-Lite Co., 30 East Forty-second Street, New York, manufacturer of acetylene gas, welding equipment, etc., is considering branch plant at Toledo Ohio, to cost about $180,000 with equipment.

Hall China Co., East Liverpool, Ohio, will install overhead conveyors and other mechanical-handling equipment, in addition to mills, presses and other machinery, in new plant on 21-acre tract, for which general contract has been let to Minton-Scobell Co., Arcade Building, Cleveland, to cost over $600,000.

American Shipbuilding Co., Cleveland, has established new department for production of marine engines for seagoing vessels, including parts and assembling, and will begin operations at once.

Board of Works, Lakewood, Ohio, is asking bids until May 12 for municipal incinerator plant, including material-handling equipment, to cost about $75,000. A. E. Fisher, City Hall, is city engineer.

The Crane Market

ONLY a small total of new inquiry is in the market for electric overhead cranes, but considerable business is expected to be placed shortly. The Pan-American Petroleum & Transport Co., New York, has closed on a 25-ton, 4-motor crane for export, with the Box Crane & Hoist Corporation.

Locomotive crane and shovel business is quiet, but some fair inquiries for shovels are in the market from contractors on hydroelectric and subway projects. The Pennsylvania Railroad has closed on a number of 7½-ton special locomotive cranes and will buy more of this type later. No action has been taken as yet by the Amtorg Trading Corporation, New York, on its list of locomotive and crawl-tread cranes and shovels for export to Russia.

Pittsburgh

PITTSBURGH, May 5.—The slight improvement in business which characterized the last days of April continues and new inquiry is particularly encouraging. The American Bridge Co. is expected to close this month on 12 tools for its machine shop at Ambridge, but no other lists of consequence are pending. Both the Baltimore & Ohio and the Norfolk & Western are buying a few tools, but only one or two for each road are on inquiry, and it now seems certain that the bulk of railroad business to be placed this year will be delayed until after the railroad equipment builders' show at Atlantic City in June.

Dealers in this district are now able to make fairly prompt deliveries on the general run of tools, although heavy equipment builders have heavy backlogs and time of delivery is a prominent factor in the placing of business. Replacement and reconditioning parts are still an important feature of the market.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has plans for an addition to sheet glass plant at Crystal City, Mo., one story, 100 x 325 ft., to cost over $850,000 with machinery.

Buffalo, Rochester & Pittsburgh Railroad Co., 155 Main Street West, Rochester, N. Y., is planning to rebuild part of engine house and repair departments at Dubois, Pa., destroyed by fire April 28.

J. C. Armstrong, Etna, Pa., borough clerk, is asking bids until May 21, for a 250-hp. horizontal watertube boiler with accessories. J. N. Chester Engineers, Inc., Clark Building, Pittsburgh, is engineer.

Duquesne Gas Co., Pittsburgh, is disposing of a note issue of $1,000,000, proceeds to be used in part for extensions and improvements in natural gas properties and pipe lines in western Pennsylvania.

Board of Education, Washington, Pa., is planning installation of manual training equipment in new three-story junior and senior high school to cost $850,000, for which plans will be drawn by E. B. Lee, Chamber of Commerce Building, Pittsburgh, architect. C. L. Woolridge, Inc., Fulton Building, Pittsburgh, is engineer.

Milwaukee

MILWAUKEE, May 5.—Machine-tool business in this district reflects improvement in the metalworking industries generally. The past week again made slight gains in the volume of transactions and inquiry was also active. The local payroll again shows a gain, and in some instances the number of men at work now is above the 1929 peak, although this is not the rule.

Bucyrus-Erie Co., South Milwaukee, Wis., is completing installation of new foundry equipment costing about $200,000. Additions include a fourth electric furnace and new annealing equipment. Production and sales are reported at practically same volume as a year ago.

Prescott Co., Menominee, Mich., is operating at full capacity following receipt of several large orders for oil pipe-line pumping equipment. An unnamed interest has placed order for fifteen units with capacity of 30,000 bbl. daily, each operated by 400-hp. Diesel engines. Texas-Empire Pipe Line Co. has ordered three pumps of 37,000 bbl. daily capacity.

Wirig Machine Works, Antigo, Wis., is about to place contracts for a one-story machine shop and forge addition, 90 x 100 ft., to cost $30,000 with equipment.

Childs & Smith, architects, 720 North Michigan Avenue, Chicago, are taking bids until May 21 for new $350,000 high school, with manual arts departments, at Wisconsin Rapids, Wis. Guy Nash is president of board of education.

Nordberg Mfg. Co., Milwaukee, has placed contract with Meredith Brothers Co., 253 Washington Street, local, for alterations in plant and erection of machine shop addition, 32 x 60 ft.

Tobin Tool & Die Co., 220 Ruggles Street, Fond du Lac, Wis., has plans by F. J. Stepnoski, local architect, for one-story toolroom addition, 50 x 60 ft.

Board of Vocational Education, South Milwaukee, Wis., will be ready for bids about June 1 for new manual arts institute costing about $80,000, to replace school damaged by fire some time ago. It will contain eight shop rooms, including foundry, machine shop, electrical and automobile repair shops. Architects are Merman & Skogstad, LaCrosse, Wis. H. W. Daehling is city clerk.

Michael Ozagovich, Sixty-eighth Street and Motor Avenue, Wauwatosa, Wis., will build a one-story addition, 40 x 44 ft., to general machine and welding shop.

George H. Smith Steel Casting Co., 500 Clinton Street, Milwaukee, has placed general contract with Austin Co., Cleveland, for machine shop and assembling floor, 149 x 202 ft., as first unit of new shop group at South Chase Street and East Holt Avenue. Trackson Co. division will occupy first unit. Walter H. Stiemke is vice-president and general manager.

Line Material Co., South Milwaukee, Wis., manufacturer of pole line hardware, fixtures, etc., has entered agreement with Gary Screw & Bolt Co., Gary.

Ind., whereby latter company furnishes raw material and Line Material Co. finishes and merchandises pole line fastenings. Some additions will be made to equipment at South Milwaukee. W. D. Kyle is president and general manager.

Grand Trunk, Canadian National Railways, has placed contract with Manitowoc Ship Building Corporation, Manitowoc, Wis., for new steel carferry costing $1,000,000, to replace Milwaukee lost in storm last October. New vessel will have overall length of 360 ft., with 56-ft. beam, and accommodate 30 freight cars.

Hamilton Mfg. Co., Two Rivers, Wis., manufacturer of wood and metal furniture, etc., has broken ground for a new administration building, five stories, with eight-story tower in center, to cost about $500,000. W. F. Dolke, Jr., 9 South Clinton Street, Chicago, is consulting engineer. Immel Construction Co., Fond du Lac, Wis., is general contractor.

Cutler-Hammer, Inc., Milwaukee, has purchased Union Electric Mfg. Co., also of Milwaukee, manufacturer of drum type motor control apparatus. Branch sales offices and warehouse stocks of Union company will be consolidated immediately with Cutler-Hammer branch offices and warehouses. Union company's factory will be operated as a manufacturing division of Cutler-Hammer. E. F. LeNoir, president of Union company, will become a member of headquarters sales organization of Cutler-Hammer company.

Ransom Mfg. Co., Oshkosh, Wis., has changed its name to Ransom Grinding Machine Co.

Cincinnati

CINCINNATI, May 5.—Machine-tool buying continues spotty. Demand for lathes, however, increased slightly the past week, manufacturers receiving a number of orders for one or two machines. Briskness of inquiry continues, but quotations are not being acted upon. Machine tool production is still below capacity.

Cincinnati Store Fixture Mfg. Co., 109 West Pearl Street, Cincinnati, will soon take bids on general contract for one-story and basement plant at Mariemont, Ohio, to cost over $200,000 with equipment.

National Recording Pump Co., Dayton, Ohio, manufacturer of gasoline pumps, parts, etc., is arranging for change of name to National Pumps Corporation.

Champion Coated Paper Co., Hamilton, Ohio, has awarded general contract to F. K. Vaughn Building Co., Hamilton, for one-story addition, to cost over $85,000 with equipment.

Palmyra Power Co., Erin, Tenn., has plans for new steam-operated electric generating plant, with transmission lines to Marion and vicinity, to cost about $75,000. L. F. Stone is head.

Automobile Rotary Lift Co., 1055 Kentucky Street, Memphis, Tenn., manufacturer of automobile jacks, etc., has arranged for an increase in capital from $200,000 to $500,000, part of fund to be used for expansion.

James Supply Co., 1104 Market Street, Chattanooga, Tenn., hardware metal goods, etc., has awarded general contract to Martin & Warlick, 1815 Central Avenue, for four-story storage and distributing plant, 90 x 110 ft., to cost over $85,000 with equipment. R. H. Hunt & Co., James Building, are architects.

Simplicity System Co., Volunteer Life Building, Chattanooga, Tenn., manufacturer of building contractors' equipment and appliances, has awarded general contract to Rogers & Leventhal, 822 East Eleventh Street, for new two-story plant primarily for assembling. One 25-ton and two 4-ton cranes will be installed. Company is affiliated with West Construction Co., same address. L. H. Bull, Volunteer Life Building, and N. G. Monning, 513 Arcadia Street, are architects.

Board of Education, Memphis, Tenn., plans installation of manual training equipment in new three-story junior high school in southeast district, for which general contract has been let to S. & W. Construction Co., Shrine Building, to cost $250,000. E. L. Harrison, Fidelity Building, is architect.

Aluminum Industries, Inc., is planning to move its muffler division from Utica, N. Y., to Cincinnati.

Chicago

CHICAGO, May 5.—In contrast with a week ago, the local machine tool market appears dull. As a matter of fact, however, conditions have returned to the average of the first three weeks in April. The closing of lists by the Nash Motors Co. and the Majestic Household Utilities Corporation took from the market the two outstanding industrial lists. Fresh inquiry is scattered and not in large volume. Old requests for prices are unusual in that in the greater number of cases they remain alive a long time and often suddenly come up as orders.

The Rock Island will buy two 60-ton bushing presses and a metal band-saw and the Milwaukee Road will purchase a 6-in. x 6-in. hacksaw. The American Steel & Wire Co. is in the market for a shaper-planer and the Inland Steel Co. wants a 24-in. used lathe and two reconditioned grinders. Aetna Ball Bearing Co., Chicago, is in need of a cutting-off machine. Outstanding among new purchases is equipment for the Racine plant of the Nash Motors Co.

Hump Hairpin Mfg. Co., 1918 Prairie Avenue, Chicago, manufacturer of wire goods, has plans for one-story addition, to cost about $40,000 with equipment. Leichenko & Esser, 28 South Dearborn Street, are architects.

Railroad Supply Co., 220 South State Street, Chicago, manufacturer of railroad equipment and supplies, has leased, with option to purchase, one and two-story plant in course of erection at Lavergne Avenue and West Sixty-fifth Street, originally designed for Temple Radio Co., Chicago. Acquiring company will remove to new location and provide additional equipment for increase in capacity. Company has also taken option on adjoining property for future expansion.

City Council, Colorado Springs, Colo., has revised plans for addition to municipal electric light and power plant, to cost about $50,000 with equipment. Earl Mosely is city manager.

Northern Pacific Railway Co., Railroad Building, St. Paul, Minn., has taken bids for an addition to engine house, with repair facilities, at Duluth, Minn., to cost about $45,000 with equipment.

Midland United Co., 72 West Adams Street, Chicago, operating electric light and power properties in several states, is disposing of a preferred stock issue to total $12,125,000, part of fund to be used for extensions and improvements.

Grocers Wholesale Co., Ninth and Cherry Streets, Des Moines, Iowa, plans installation of conveying, elevating and other mechanical-handling equipment, including factory trucks, etc., in new two-story storage and distributing plant, 120 x 400 ft., to cost about $200,000.

Dabrol Products Corporation, 6265 West Sixty-sixth Place, Chicago, manufacturer of oil specialties, is planning to rebuild part of refinery destroyed by fire April 30, with loss in excess of $130,000 including equipment.

Northern States Power Co., 15 South Fifteenth Street, Minneapolis, has plans for an addition to steam-operated electric power plant at Minot, N. D., to cost about $160,000 with equipment. Engineering department of company is in charge.

A. L. Denniston, secretary of Stromberg Electrical Co., 223 West Erie Street, Chicago, and associates, have organized Stromberg Motoscope Corporation, to establish plant for manufacture of motor-testing equipment and devices. E. A. Stromberg, son of founder of Stromberg Carburetor Co., heads new company.

H. D. Conkey & Co., Mendota, Ill., builders of overhead traveling cranes and other industrial equipment, have changed name of crane manufacturing department to Conco Crane & Engineering Works, division of H. D. Conkey & Co.

Atlas Boiler & Welding Co., Elgin, Ill., recently organized, is occupying 6000 sq. ft. of floor space at 50 Dexter Avenue, and is equipped to do oxy-acetylene and electric welding and cutting. H. V. Vale, formerly with George E. Corbett Boiler & Tank Co., Chicago, is general manager.

Detroit

DETROIT, May 5.—United States Pressed Steel Co., Ypsilanti, has purchased a plant at Kalamazoo, heretofore held by Youngstown Sheet & Tube Co., and will remove to that location, providing facilities for increased output. Company recently sold Ypsilanti property to Ford Motor Co. for a hydroelectric power development. United States company has abandoned plan to acquire another site for a new mill as recently announced, and will concentrate production at Kalamazoo.

Village Council, Dundee, will receive bids until May 15 for equipment for water purification and softening plant for municipal waterworks, including pumping machinery and motors, heating plant, filter and other machinery. George Champe, Nicholas Building, Toledo, Ohio, is engineer.

Michigan Public Service Co., Ludington, has plans for a new steam-operated electric power plant at Leland, to cost about $45,000 with equipment. Lewis Schmidt, State Bank Building, Traverse City, is architect; company engineering department in charge of mechanical work.

General Parts Corporation, 2505 Bellevue Avenue, Detroit, manufacturer of automobile parts and equipment, has made offer of $132,500 at public sale for purchase of plant of Stearns Motor Co., Ludington, highest bid received, and sale

will be ratified by court. Purchasing company will remodel property for branch plant.

Mark Coyne, 907 Second Avenue, Escanaba, has awarded general contract to Emil Berquist, 1144 Washington Square, for one-story machine shop, 40 x 100 ft., to cost about $32,000 with equipment.

B. F. Goodrich Rubber Co., Akron, Ohio, manufacturer of automobile tires, tubes, etc., has purchased property at Grand Rapids and has awarded contract to Owen, Ames, Kimball Co., that city, for new factory branch, storage and distributing plant, to cost about $70,000 with equipment.

Hansen & Jensen Oil Co., Escanaba, is considering new oil storage and distributing plant, to cost about $45,000 with equipment.

Otwell Co., 17005 Fullerton Street, Detroit, manufacturer of heaters, heating equipment, etc., has awarded contract to Loeffler & Casenhiser, General Motors Building, for one-story addition, to cost about $40,000 with equipment.

City Commission, Adrian, Mich., is considering construction of a municipal artificial gas plant and system, to cost about $700,000, and is arranging bond issue to provide for project.

City Council, Charlevoix, Mich., has plans for extensions and improvements in municipal electric light and power plant, including installation of additional equipment, to cost about $60,000. C. N. Bridge is chief engineer and general superintendent of plant.

City Council, Portland, Mich., has been authorized to issue bonds for $50,000, proceeds to be used for establishment of municipal electric light and power plant, for which plans will be prepared at once.

Bruce Products Corporation, Detroit, has moved into new and larger quarters at 5712 Twelfth Street.

St. Louis

ST. LOUIS, May 5.—Puhl & Hepper Mfg. Co., 5773-79 Thekla Avenue, St. Louis, manufacturer of mechanical dryers, blow-piping equipment, spray booths, etc., has acquired a factory at Florissant and Acme Avenues for new plant to expand present capacity.

Empire Oil & Gas Co., Empire Building, Bartlesville, Okla., operating oil and natural gas properties, is considering new gas pumping station near Ottawa, Kan., to cost over $150,000 with equipment; also a similar plant near Wichita, Kan., to cost about $100,000. Company engineering department, address noted, is in charge.

Edward C. White, 28 East Begger Street, Hutchinson, Kan., has plans for a two-story and basement machine shop, 50 x 77 ft., to cost about $28,000 with equipment.

Skelly Oil Co., Tulsa, Okla., is disposing of a preferred stock issue of $12,000,000, part of proceeds to be used for extensions and improvements in oil properties and refineries.

Terminal Railroad Association, Union Station, St. Louis, has taken out a permit for addition to locomotive repair shop, 85 x 190 ft., to cost about $75,000 with equipment. H. J. Pfeiffer, address noted, is chief engineer.

City Council, Russellville, Ark., is planning municipal airport with hangar, repair and reconditioning shop, etc., to cost about $50,000.

Board of Education, St. Joseph, Mo., plans installation of manual training equipment in new two- and three-story and basement central high school, to cost $550,000, for which it is expected to ask bids in June. Eckel & Aldrich, Corby Building, are architects. Walter E. Gillham, Interstate Building, Kansas City, Mo., is consulting engineer.

International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded general contract to Peter Kiweits Sons, Omaha National Bank Building, Omaha, Neb., for new two-story factory branch and distributing plant at Grand Island, Neb., to cost about $100,000 with equipment.

American Eagle Aircraft Co., Kansas City, Mo., is negotiating for acquisition of Szekely Aircraft Co., Holland, Mich.; Light Machine & Foundry Co., Pottstown, Pa.; Lincoln Aircraft Co., Lincoln, Neb., and Alliance Aircraft Co., Alliance, Ohio. First noted company plans consolidation of acquired interests and will carry out expansion, including production of motors for power gliders, as now produced by Lincoln company, other aircraft motors and completed aircraft.

Southwest Utility Ice Co., Petroleum Building, Oklahoma City, Okla., has work under way on one-story and basement plant at Coffeyville, Kan., 55 x 80 ft., to cost about $38,000 with equipment.

Miller Combination Bailer & Pump Co., Sapulpa, Okla., manufacturer of oil well pumping machinery and parts, has changed its name to Miller Sand Pump Co.

National Automobile Hotel Co., Commercial Exchange Building, Oklahoma City, Okla., has acquired property at 3-5 West Main Street as site for new seven-story automobile service, repair and garage building, 100 x 140 ft., to cost over $300,000 with equipment. D. I. Johnston is head.

Southwestern Machinery & Supply Co., Inc., Phoenix, Ariz., distributer of mine and mill supplies and metal-working machinery, is occupying a new warehouse with 6000 sq. ft. of floor space.

Indiana

INDIANAPOLIS, May 5.—Chicago, South Shore & Indiana Railway Co., 72 West Adams Street, Chicago, has awarded general contract to P. H. Lorenz, Moline, Ill., for one-story repair shop, 100 x 200 ft., and office unit, 35 x 100 ft., at Michigan City, Ind., to cost over $70,000 with equipment. Arthur W. Gerber, address noted, is company architect.

Electric Auto Lite Co., Toledo, Ohio, manufacturer of automobile starting and lighting devices and equipment, has purchased plant and business of Concealed Door Check Co., Kokomo, manufacturer of automobile locks and locking devices. Company will be continued at present location and will be operated under direction of Prest-O-Lite Storage Battery Corporation, Speedway, Indianapolis, a subsidiary of purchasing company.

Gordon Body Co., 306 North Talbot Street, Indianapolis, manufacturer of automobile bodies, has asked bids on general contract for one-story plant, to cost about $30,000 with equipment.

Northern Indiana Public Service Co., Hammond, is arranging for a preferred stock issue of $5,000,000 and common stock issue of 500,000 shares, to yield a total of $9,550,000, part of fund to be used for extensions and improvements in electric power plants and system, including completion of new steam-operated electric generating plant at Michigan City, on which work recently was started. Steel tower transmission lines, switching stations, etc., will be included.

Ames Shovel & Tool Co., Anderson, has awarded general contract to Central States Bridge Co., 601 Beecher Street, Indianapolis, for rebuilding one-story plant, recently destroyed by fire, to be 100 x 600 ft., to cost over $100,000 including equipment. E. P. Miller, Farmers' Trust Building, Anderson, is architect.

Emerson-Scheuring Tank Co., 1914 Singleton Street, Indianapolis, manufacturer of steel tanks, steel plate products, etc., has removed its plant to 2073 Martindale Avenue, for increased production.

Gulf States

BIRMINGHAM, May 5.—Alamo Battery Co., 909 Broadway, San Antonio, Tex., has plans for one-story service and repair shop, 50 x 75 ft., to cost about $20,000 with equipment. Harrington Co., Builders' Exchange Building, is architect and engineer.

Frank R. Heck Plumbing & Heating Co., 915 South Eighteenth Street, Birmingham, has awarded contract to Woolard & Lynch, 2115 North First Avenue, for one-story storage and distributing plant, including pipe department, to cost about $30,000 with equipment. Denham & Denham, Comer Building, are architects.

Henderson Cotton Co., Houston, Tex., is considering rebuilding cotton compress, storage and distributing plant on Houston ship channel, recently destroyed by fire.

Airport Committee, Municipal Flying Field, Shreveport, La., has had plans approved for new buildings at municipal airport, including hangars, reconditioning and repair facilities, to cost about $100,000.

Morehouse Parish School Board, Bastrop, La., plans installation of manual training equipment in addition to local high school, to cost $120,000, for which bids are being asked on general contract until May 15. J. W. Smith & Associates, Ouachita National Bank Building, Monroe, La., are architects.

United Power & Light Corporation, Abilene, Kan., has acquired gas acreage of Shell Petroleum Corporation, Shell Building, St. Louis, in oil fields near Amarillo, Tex., and plans construction of pipe line to connect with system in Kansas, for natural gas supply, to cost over $500,000 with compression stations, etc. Company is operated by North American Light & Power Co., 231 South LaSalle Street, Chicago.

West Texas Utilities Co., Abilene, Tex., has purchased municipal electric light and power plant, and waterworks at Stratford, Tex., for $102,000, and agrees to expend from $100,000 to $150,000 for extensions and improvements, including installation of additional equipment, to develop property for central station service.

Southwestern Can Co., Inc., 1207 Mary Street, Houston, Tex., manufacturer of tin cans, has purchased property in Neils-Esperson Industrial District, totaling about 100,000 sq. ft. space, as site for new one-story plant of 60,000 sq. ft. of floor space, to cost over $100,000 with equipment.

Lake Griffin Pulp & Paper Corporation, Leesburg, Fla., care of Mary J. Cassady, Tavares, Fla., recently organized, has

leased grass rights on 30,000 acres of State-owned property, for raw material supply for new pulp and paper mill, to cost over $3,500,000 with equipment.

Board of Education, Spearman, Tex., contemplates installation of manual training equipment in addition to local high school, to cost about $125,000. Rittenberry & Carder, Amarillo, Tex., are architects.

Berger Mfg. Co., Canto, Ohio, manufacturer of metal ceilings, a unit in merger of Berger company and Republic Steel Corporation, Youngstown, is arranging for closing of branch plant at Jacksonville, Fla., effective May 15, production to be concentrated at Canton mill.

City Council, Ocala, Fla., is considering extensions and improvements in municipal electric light and power plant, including installation of additional equipment.

Pacific Coast

SAN FRANCISCO, May 1.—City Commission, Stockton, Cal., has applied for permission to use water from Calaveras River for a municipal hydroelectric generating plant, to cost over $1,000,000 with transmission lines. W. B. Hogan is city manager in charge.

Pacific Bone, Coal & Fertilizer Co., Financial Center Building, San Francisco, has plans for a two and six-story fertilizer manufacturing plant at South San Francisco, to cost about $125,000 with equipment. Ellison & Russell, Pacific Building, are engineers.

Kinney Iron Works, 2724 Santa Fe Avenue, Los Angeles, has awarded contract to Consolidated Steel Corporation, 1200 North Main Street, for one-story foundry and shop, 150 x 180 ft., at Vernon, to cost about $50,000 with equipment.

Pan-Pacific Piling & Construction Co., Richmond, Cal., operating a local plant for manufacture of concrete piles, is considering additions for new division to manufacture reinforced-concrete pipe under a patented process.

Firestone Tire & Rubber Co., Akron, Ohio, has revised plans for a new factory branch, storage and distributing plant at Palo Alto, Cal., to cost $200,000, for which bids will soon be asked on general contract. Charles W. McCall, 1404 Franklin Street, Palo Alto, is architect.

Santa Paula Rock & Pipe Works, Santa Paula, Cal., has plans for additions to plant on Twelfth Street, to cost over $35,000 with equipment.

In connection with expansion and improvement program at motion picture laboratories, Metro-Goldwyn-Mayer, Inc., Culver City, Cal., plans installation of central electric power plant, with motor-generator set and auxiliary equipment. Entire project will cost about $1,000,000.

Puget Sound Power & Light Co., Seattle, is disposing of a bond issue of $9,000,000, part of fund to be used for extensions and improvements in power plants and system, including transmission lines.

Pittsburg School District, Pittsburg, Cal., will build a one-story vocational shop in connection with new junior high school group to cost $150,000, for which plans have been prepared by Davis-Pearce Co., Grant and Weber Streets, Stockton, Cal., architect.

Pacific Lighting Corporation, 433 California Street, San Francisco, is planning construction of a pipe line from Kettleman Hills and Button Willow oil districts to Los Angeles and vicinity, for natural gas supply, to cost over $4,000,000.

Canada

TORONTO, May 5.—Plans are being prepared by W. C. Owen Co., 537 Guardian Building, Cleveland, Ohio, for a cyanide mill near Timmins, Ont., for Porcupine United Gold Mine, to cost $200,000.

Canadian Canners, Ltd., has awarded contract to Oxley Brothers for a plant at Kingsville, Ont., to cost $20,000. Equipment to cost a like amount will be installed.

British Columbia Electric Railway Co., Ltd., Carroll and Hastings Streets, Vancouver, B. C., will start work soon on a substation addition, to cost $215,000. J. I. Newell is engineer.

Plans have been completed for a plant at New Westminster, B. C., for British Columbia Refractories, Ltd., to cost $100,000.

Foreign

PLANS are being arranged by officials of Polymet Mfg. Corporation, 829 East 134th Street, New York, manufacturer of radio equipment and devices, and A. H. Hunt, Ltd., Croydon, England, for organization of joint British company to manufacture products of first noted corporation. It is proposed to begin work soon on new plant near London, for parts production and assembling, to cost over $100,000 with equipment. Cyril H. Hunt is head of Hunt organization and is now on visit to United States to complete details of project.

Officials of Claude Neon Lights, Inc., 41 East Forty-second Street, New York, manufacturer of gaseous tube-lighting equipment for outdoor service, General Electric Co., Ltd., London, England, and Aktiengesellschaft für Elektrizitats-Industrie, Berlin, have organized a joint subsidiary under name of Claude General Neon Lights, Ltd., with headquarters at London, to manufacture and distribute kindred products throughout Great Britain and Ireland. Plans are under way for establishment of new plant near London, to cost about $100,000 with equipment. W. T. P. Hollingsworth, president of Claude Neon Lights, will be an official of new company.

Piedmont Hydro-Electric Co. (Societa Idroelettrica Piemonte), Piedmont, Italy, operating a group of electric light and power utilities in Piedmont and Lombardy districts, is disposing of a bond issue of $10,000,000, part of proceeds to be used for extensions and improvements in power plants and system.

Russian Soviet Government, Moscow, is arranging lists of heavy railroad machinery and equipment to be purchased in United States and Canada within the next three to four months. A delegation from that country, headed by N. Cosores, is now inspecting railroad systems, lines, shops, etc., here and in Canada in connection with forthcoming commitments. Amtorg Trading Corporation, 261 Fifth Avenue, New York, is official buying agency for Soviet Government in United States.

Showa Fertilizer Co., Tokyo, Japan, is planning construction of a new plant for production of ammonium sulphate, in connection with works for manufacture of lime nitrogen products, recently placed in service. New plant will be located near Yokohama and will have initial output of about 100,000 tons per year, to cost close to 10,000,000 yen (about $5,000,000).

New Trade Publications

Furnace Refractories.—Quigley Furnace Specialties Co., Inc., 56 West Forty-fifth Street, New York. Bulletin of 23 pages, dealing with "Hytempite" for use in boiler settings, baffles, special shapes, repairs, etc., which is said to be gas and air-tight and will not loosen with sudden changes of temperature. Various illustrations are shown.

Skip Hoist.—Link-Belt Co., Chicago, Ill. Booklet 946 of 48 pages featuring the Link-Belt skip hoist for a wide scope of uses. Various photographs of installations and tables of dimensions are given, with speeds and commodities handled differing greatly.

Temperature Measuring Instruments.—Illinois Testing Laboratories, Inc., 141 West Austin Avenue, Chicago. Four-page folder, illustrating and describing portable and stationary "Alnor" pyrometers, especially suited for measuring the temperature of molten type metal, babbitt, lead, solder and white metal, which are poured or cast at low temperatures.

Roller-Bearing Shapers.—Western Machine Tool Works, Holland, Mich. Catalog 80 covering line of Steptoe shapers equipped with Timken roller bearings. Various illustrations are shown. List of duplicate parts for reorder, also table of specifications are included.

Gears.—General Electric Co., Schenectady, N. Y. Bulletin GEA-1236 dealing with Fabroil gears, and bulletin GEA-1242, devoted to Textolite gears, each covering four pages, illustrate and describe the application of these two types of gears.

Tube-Turns.—E. F. Keating Co., New York. Broadside illustrating applications of short radius bends for welding into pipe lines, and advantages over screwed and flanged fittings in similar installations.

Safety Switches.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Catalog 226, containing full information on porcelain base safety switches, industrial safety switches, motor starting switches, range and commercial cooking switches, motor service switches, and breakers and overload protective devices. A new type "C" WK-97 switch is introduced with service features for motor circuits. All ratings in catalog are standardized according to national electric code regulations on switches and motor production.

Automatic Welding Head.—General Electric Co., Schenectady, N. Y. Folder GEA-556C describing type MC head, adaptable to traversing or turntable devices for making continuous seams in steel, and which functions as a device for feeding welding wire at such a rate that the arc characteristics are stabilized.

Crawler Equipment.—American Manganese Steel Co., Chicago Heights, Ill. Four-page folder illustrating and describing manganese steel crawler links and sprockets for Holt and Best tractors. List of sizes and prices is given.

Tumbling Mill and Dust Arrester.—W. W. Sly Mfg. Co., Cleveland. Bulletin

The Week's News Quickly Told

Current Events That Bear on the Course of Business

RECOVERY of general business can be further quickened if a steady flow of capital to the home builder can be provided, said President Hoover. He believes that co-operative action has greatly mitigated the evil after-effects of last fall's speculative panic.

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TRADE, both wholesale and retail, is improving slowly if at all . . . Statistics from various branches indicate from 5 to 20 per cent recession from gross receipts during the first quarter of 1929. Grocery trade is the single exception; it is holding its own.

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FAILURES in April, while less in number and in total liabilities than in March, set a new record for the month.

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STOCK market quotations slumped 8¼ points (composite of 100 representative issues) to 170, a figure approaching the low of last fall . . . Brokers' loans have expanded almost without interruption since January 22, and are now about 25 per cent higher than in December, totaling 4¼ billion dollars . . . Bank rates in leading money markets are reduced to lowest figure in five years.

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COMMODITY prices set a record low at 132.3 (1913 average = 100), due to further declines in metals, provisions, wheat and sugar.

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CUBAN sugar has touched the lowest price in 28 years . . . By an almost unanimous vote of the participants, the single sales agency for cane sugar was dissolved. It was formed by the Cuban government a year ago to regulate markets and exports.

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WHEAT, to the extent of about one-third the visible supply, is held by the Federal Farm Board . . . Answering criticism from leaders in the grain trade, who charge unfair competition, Secretary of Agriculture Hyde said that the Federal Farm Board has not nor will it attempt to "peg" price for wheat, or other farm products. Chairman Legge said that the board is endeavoring to "stabilize" prices to prevent unnecessary depression.

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CURTAILMENT of cotton mills, in order to reduce the large surplus stocks of goods, is agreed upon. Alternate weekly or alternate fortnightly operations are the favored methods . . . United Textile Workers' Union has joined with the owners in a study of operations which has instituted scientific management in the Pequot Mills. Twelve-minute rest periods are set for each hour. The effect is "better jobs, better wages and better working conditions."

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INSTALMENT paper, past due, is three per cent greater in volume than normal, according to reports of 400 finance companies . . . Nine per cent of all retail sales are on the instalment plan, according to the Department of Commerce, on which there is 0.3-per cent loss in bad debts. Credit sales comprise 32 per cent of the total, and cash is paid for 59 purchases in 100 . . . R. W. Lyons, National Chain Store Association, said that the 6000 separate chains do about 15 per cent of the retail business.

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COAL mining is expanding somewhat. In the Central States the opening of navigation on the Great Lakes is responsible . . . Anthracite collieries are generally running at capacity to fill orders placed at summer rates.

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DIESEL motors are inherently unsuited for automobiles, said Alvan Macaulay, president Packard Motor Car Co., since the cycle does not produce the smooth flexible mechanism required by the American public. Furthermore, the compression required is on the order of six times as great . . . Whereas the sales of all cars in March were slightly greater than the three-year average, if the low-priced cars, Plymouth, Ford and Chevrolet, are eliminated, the sales of all others figure to two-thirds the previous rate . . . Deaths due to automobile accidents in 78 large cities totalled 8676 in 1929, a 13-per cent gain over the previous year.

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AIR mail, New York to Buenos Aires in seven days, is inaugurated via Havana, Canal Zone, and the West Coast . . . A two-way telephone service connects Canadian National passenger trains with all wired and wireless stations. It operates by a carrier current through the track and telegraph wires . . . Wireless telephone service is opened between Great Britain and Australia . . . American Telephone & Telegraph Co. is engaged in a two-year job of connecting Maine with Ireland by land lines to Nova Scotia and thence by transatlantic telephone and telegraph cable.

S-130 of six pages describes and illustrates Type C roller-bearing, blast cleaning, tumbling mill and dust arrester for use in cleaning castings.

Gear-Grinding Chuck.—City Machine & Tool Works, Dayton, Ohio. Folder of four pages describing No. 1 and No. 2 Bolender gear-grinding chucks. No. 1 accepts 20-tooth, 6-8 pitch and smaller; No. 2 accepts 31-tooth, 6-8 pitch to 20-tooth, 6-8 pitch. Special chucks are made to meet unusual conditions.

Gray Iron Castings.—Whiting Corporation, Harvey, Ill. Two four-page leaflets, illustrated, contain Part I and II of a series of papers on "Cast Iron and Its Manufacture," this one entitled "High-Test Gray Iron," by Dr. Edward E. Marbaker, Mellon Institute of Industrial Research, Pittsburgh.

Electric Heat-Treating Furnaces.—Hevi Duty Electric Co., Milwaukee. A six-page bulletin, No. 430, illustrated, describes 18 standard sizes of box-type electric furnaces, including complete details and specifications.

Ingot Molds.—Vulcan Mold & Iron Co., Latrobe, Pa. An illustrated one-page leaflet describes solid, split and pig molds from 50 lb. to 20 tons, made from patented desulphurized Vulc-Iron.

Electric Heat-Treating Furnaces.—H. O. Swoboda, Inc., Pittsburgh. A small, eight-page, illustrated leaflet describes this company's Falcon continuous electric furnace for heat treating strip metal and wire.

Rust Protector.—Intertol Co., Inc., 253 Broadway, New York. A small four-page illustrated leaflet, entitled "The Vital Points of Holder Protection," describes the effect of using Imunol which floats on the surface of a tank containing corrosive liquids and is claimed to protect portions which are starting to rust on the inside, the Imunol floating on the top.

Electric Furnaces.—Ajax Electrothermic Corporation, Trenton, N. J. Bulletin No. 6 of 12 pages, fully illustrated, describes various installations of the Ajax-Northrup coreless, high-frequency induction furnaces.

Steel Castings.—Sivyer Steel Casting Co., Milwaukee and Chicago. A series of nine leaflets describes properties and applications of a special alloy steel casting called Miraculoy.

Desulphurizer. — Mathieson Alkali Works, Inc., New York. A two-page leaflet describes the application of Purite and emphasizes the loss which can be avoided by its use in refining molten gray iron, malleable iron and non-ferrous metals.

Tramrails.—Cleveland Electric Tramrail, division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio. A four-page illustrated leaflet entitled "Cleveland Tramrail" describes application of various equipment produced by this company in handling material, the illustrations showing typical installations.

Protective Coatings.—Udylite Process Co., Detroit. An elaborate pamphlet of 34 pages, fully illustrated, describes the Udylite process of coating metals with cadmium and includes a description of the company's organization with photographs of leading officials and directors.

Alloy Steels.—International Nickel Co., New York. "Alloy Steels in the Railroad Field," by Charles McKnight of the Nickel company, is the title of a 16-page booklet which is a reprint of an address delivered at the annual meeting, Dec. 2 to 6, 1929, of the American Society of Mechanical Engineers, New York. It is fully illustrated and attractively presented.